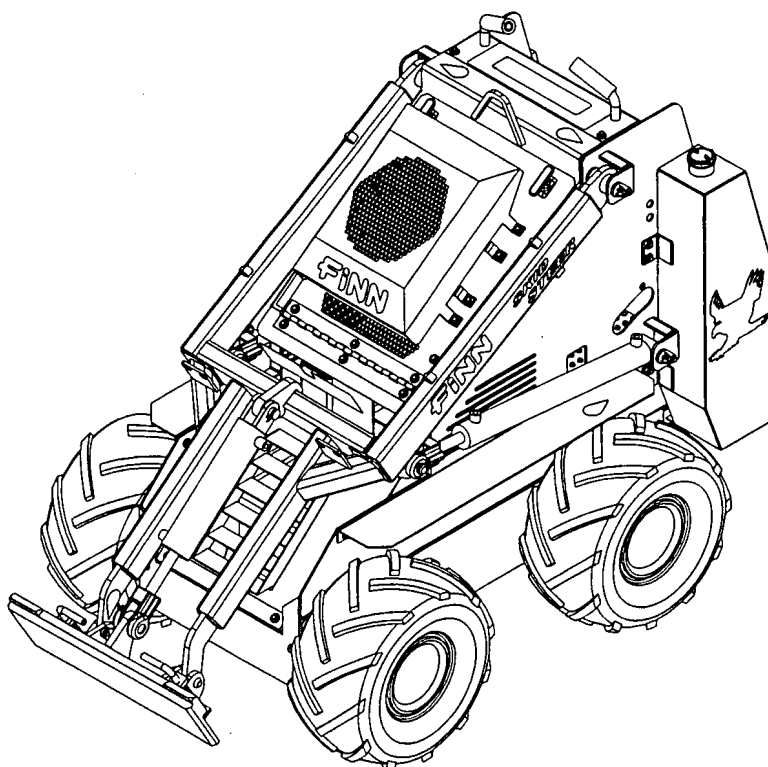


FINN[®]

CORPORATION

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Eagle 250 Skid Steer

Parts and Operator's Manual

Model SS

Serial No. _____

Exhibit D

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SAFETY FIRST

With any piece of equipment, new or used, the most important part of its operation is **SAFETY!**

Finn Corporation encourages you and your employees to familiarize yourselves with your new equipment and to stress safe operation.

The first six pages of this manual are a summary of all the main safety aspects associated with this unit. Be sure to read completely before operation of machine.



This symbol is used throughout the operation and maintenance sections of this manual to call attention to safety procedures.

- Pay Attention -



DANGER:

Immediate hazards which **WILL** result in severe personal injury or death.



WARNING:

Hazards or unsafe practices which **COULD** result in severe personal injury or death.



CAUTION:

Hazards or unsafe practices which **COULD** result in minor personal injury or product or property damage.

IMPORTANT:

Indicates that equipment or property damage could result if instructions are not followed.

NOTE:

Gives helpful information.

Finn Corporation

CALIFORNIA

Proposition 65 Warning

The engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

CALIFORNIA

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

SKID STEER SAFETY SUMMARY SECTION

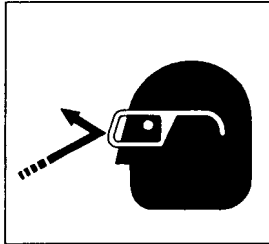
It is important that all operators of this machine are familiar with all the safety aspects mentioned below before operating the machine. Always keep a copy of this manual with the machine. It is the responsibility of the operator of the machine to fully understand this safety section. Remember that YOU are the key to safety. Good safety practices protect not only you but also the people working with and around you. Keep in mind that this safety sheet is written for this type of machine only. Practice all other usual and customary safe working precautions; and above all, remember that safety is up to you.

I. PRE-START EQUIPMENT CHECK (equipment check is to be made with the engine off):

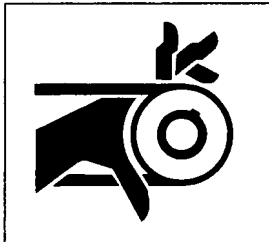
1. Verify that all guards are in place.
2. Check the tires for proper inflation.
3. Inspect all hydraulic hoses and tubes for cracks, bulges or damage. If hose or tube is bad, replace immediately.
4. Keep equipment and operator's platform clean of oil, fuel spillage, and any other dirt or debris build-up.
5. Remove obstacles such as rocks, tree limbs, etc. from the work area. Tall grass and weeds can hide obstacles.

II. MACHINE OPERATION:

1. Always wear safety goggles when operating the machine. Other safety attire such as safety shoes, ear protection, gloves, hard hats, dust masks, etc., should be worn as required by warning decals on machine, operator's manuals, job requirements, or local ordinances and insurance regulations. Remove rings, watches, etc. Avoid loose fitting clothing, which may get caught in rotating machinery.



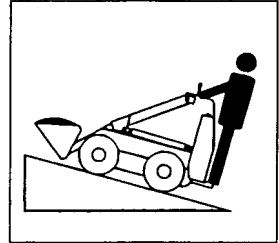
2. Do not operate the machine without all guards in place.



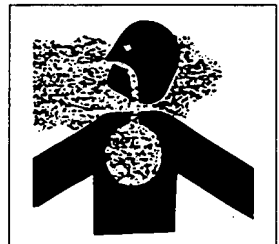
3. When operating on wet grass, reduced traction could cause sliding.
4. Make sure that no one is working on the machine. Make sure the work area is clear of all persons, animals, etc. Keep unauthorized personnel away from the machine and attachments at all times. Only responsible adults, who are familiar with the instructions, are to operate the machine. Never allow children to operate the machine.

5. Never attempt to connect or disconnect auxiliary couplers while operating any attachments.

6. Operate up and down slopes with the heavy end of the machine uphill. An empty bucket makes the rear the heavy end and a full bucket makes the front of the machine the heavy end. Most other attachments will make the front the heavy end.



7. Never operate machine in an enclosed area without venting the exhaust of the unit. Deadly carbon monoxide fumes can accumulate.

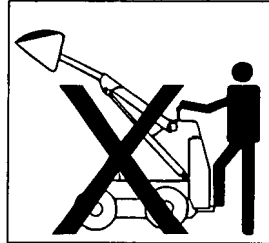


8. Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction.
9. Avoid turning on slopes. If you must turn, turn slowly and keep the heavy end uphill.
10. Slow down when turning. Sharp turns on any terrain may cause loss of control.
11. Never operate this or any machinery when fatigued, tired, under the influence of alcohol, illegal drugs or medication. You must be in good physical condition and mentally alert to operate this machine. Always be aware of obstructions, which may cause injury to the operator or damage the machine.
12. Never modify the machine. Never remove any part of the machine (except for service and then reinstall before operating).
13. Use only FINN approved attachments. Other attachments can change stability of machine and may void warranty.
14. When leaving the equipment unattended for any reason, be sure to:
 - A. Lower loader arms.
 - B. Shut off engine.
 - C. Take keys with you.
 - D. If on a steep grade, block the wheels.

These actions are recommended to avoid unauthorized use, runaway, vandalism, theft and unexpected operation when the equipment is restarted.

15. Do not smoke, read, eat or otherwise lose or lessen your attention in any manner while operating the SkidSteer. Operating is a full time job.

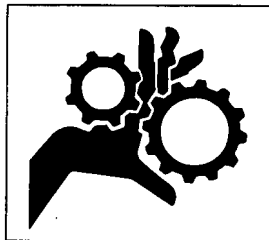
16. Do not carry arm in the raised position. Always carry loads close to the ground. Do not step off of the operating platform with the load raised.



17. Check carefully for overhead clearances before driving under them. Never contact any obstruction.
18. Stay clear of all electrical conductor lines.
19. Do not try to stabilize the machine with your hands or feet.
20. Do not exceed a slope of 15 degrees. Avoid starting or stopping on slopes.
21. Never carry passengers on equipment or attachments. This is not a toy and should not be used for recreation. Do NOT fool around, operate in a smooth controlled fashion.
22. Do not exceed the rated operating capacity, as machine may become unstable which may result in loss of control.
23. Operate only in daylight or sufficient artificial light.
24. Use extra care when loading or unloading the machine onto a trailer or truck. The unit should be lifted from the lift eye located on the top center frame member. When transporting the machine on a truck or trailer always properly secure using straps or chains in areas that will not damage equipment. Chain tie-down rings are provided on each side of machine.
25. Do not operate near drop-offs, ditches, or embankments. The machine could suddenly turn over if a wheel goes over the edge of a cliff or ditch, or if an edge caves in.

III. MAINTENANCE:

1. Before servicing the machine, turn off engine and allow all moving parts to stop. Disconnect the battery cables to prevent accidental starting of the machine. Tag the engine operating area to show that the machine is being serviced. Use lockout/tagout procedure (29 CFR



1910.147).

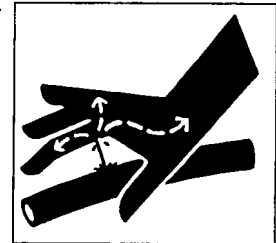
2. Battery maintenance. Lead-acid batteries contain sulfuric acid which may damage eyes or skin on contact. Always wear a face shield to avoid acid in the eyes. If acid contacts eyes, flush immediately with clean water and get medical attention. Wear rubber gloves and protective clothing to keep acid off skin. Lead-acid batteries produce flammable and explosive gasses. Keep arcs, sparks, flames, and lighted tobacco away.

3. Filling of fuel. Never fill the fuel tank with the engine running, or while smoking or when near an open flame. Never smoke while handling fuel or working on the fuel system. The fumes in an empty container are explosive. Never cut or weld on fuel lines, tanks, or containers. Wipe off any spilled fuel and let dry before starting engine.

NOTE: Be careful not to allow fuel, lubricant, hydraulic fluid, or cooling fluids to penetrate into the ground or be discharged into the water system. Collect all used fluids and dispose of them properly.

4. It is recommended that only authorized genuine FINN replacement parts be used on this machine.

5. Fuel or hydraulic fluid under pressure can penetrate the skin or eyes and cause injury, blindness or death. To check for such leaks, use a piece of cardboard or wood instead of your hand. Pressure may build up in the hydraulic system so use caution when removing the cap.



6. Perform all maintenance with the loader arms in the lowered position. If any maintenance requires the arms raised, secure the cylinder with locking device.
7. Some parts and assemblies are quite heavy. Before attempting to unfasten any heavy part or assembly, arrange to support it by means of a hoist, by blocking or by use of an adequate arrangement to prevent it from falling, tipping, swinging or moving in any manner which may damage it or injure someone. Allow all components on machine or attachments to cool before attempting to maintain, adjust or service, or before storing.
8. Stop and inspect the equipment if you strike an object. Repair if necessary.
9. If repairs require use of a torch or electric welder, be sure that all flammable and combustible materials are removed. Fuel or oil reservoirs must be emptied, steam cleaned and filled with clean water before any cutting or welding on them is attempted. Do NOT weld or cut on any tank containing oil, gasoline or their fumes or other flammable material, or any container whose contents or previous contents are unknown.

CURRENT SET OF SAFETY DECALS

! DANGER:

-Never jerk the control levers. Use a steady, smooth motion.

-Never operate the control levers unless you are standing on the operator platform and have a firm grasp on the grip handles.

To minimize risk of accidents.

-Always operate with the heavy end pointed up hill.

-Always carry load low.

-Never step off operator platform with load raised.

IMPORTANT:
For safe operation read and understand operator's manual before using unit.

IMPORTANT:
Be sure auxiliary power is off before starting unit.

OFF
RUN
START

STOPPING INSTRUCTIONS
Engine is equipped with fuel shutdown solenoid. Move throttle to mid-range before stopping.

! DANGER

- Operator must be skilled and trained in operation.
- Use safely. Machine is not a toy.
- Never use when under the influence of alcohol or drugs.
- Know the work area. Check for holes and overhead clearances. Avoid overhead power lines.
- Always place implement on ground when leaving machine.
- Use wheel chocks when parking on a slope.
- Never smoke while fueling. Stop engine before fueling.
- Stop engine and remove key before leaving machine.
- Wear close fitting protective clothing and shoes.

To Minimize the Risk of Accidents, Serious Injury or Death:

- Keep hands and feet away from all moving parts.
- Go slow and avoid sharp turns on slopes.
- Know location of underground utilities before you dig.
- Never run engine without adequate ventilation.
- Firmly hold the grip handles when operating.
- Never place feet under the operating platform.
- Keep children and other people a safe distance away.
- Never let children operate the machine.
- Never carry children or passengers.

P/N 071115

! WARNING

Do not operate without guards in place.

12178

! DANGER

HOT EXHAUST

012276

! WARNING

Turn engine off, disconnect battery, and allow all moving parts to stop before servicing equipment.

22357

! CAUTION

Wear eye protection around operating equipment.

23516

OPERATION AND MAINTENANCE MANUAL FOR FINN SKID STEER 250

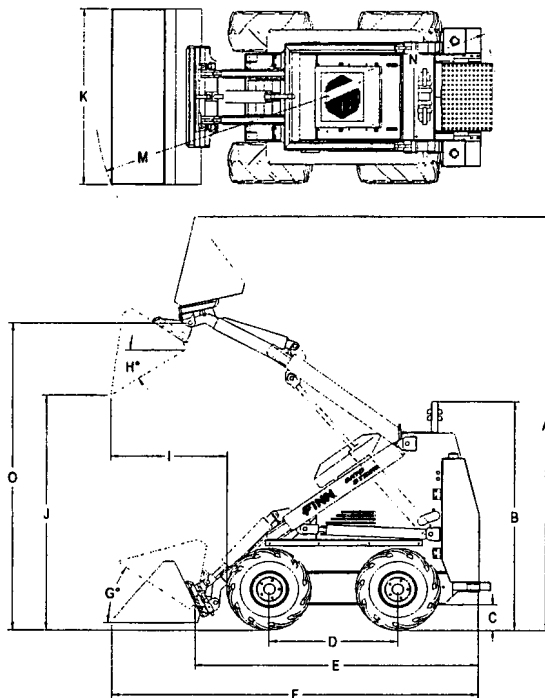
INTRODUCTION:

The FINN Corporation would like to thank you for your latest FINN purchase. In our efforts to maintain a quality and growing relationship with each and every customer, we would like to encourage you to contact us for help with service, genuine replacement parts, or any other information you may require.

The Eagle Skid Steer 250 is a compact hydraulically driven power unit. It is intended to be used with a variety of attachments. This manual is intended to provide step-by-step instructions on the operation, care, and maintenance of the Eagle 250. For best results and to insure longer life of the equipment, please follow the instructions carefully. For your safety read the entire manual before operation of this unit, as well as all supplied manuals and safety instructions for any attachments. In addition, it contains illustrations and a complete list of parts and components for easy identification. The operational lifting capacity has been calculated using an operator weighing 200 pounds and with full fuel tanks. Variations in operator weight and fuel levels will alter the lifting capacity accordingly.

FINN Skid Steer 250 Specifications

Engine	.25hp Kohler Command Pro Gas
Fuel tank	.11 US Gallon capacity (41.5 liters)
Oil capacity	.2 quarts (1.9 liters)
Hydraulic system	
Pressure	.3000 psi (211 kg/cm ²)
Flow	.13.25 gpm (50.3 lpm) @ 3600rpm
Reservoir	.14.75 gallons (56 liters)
Filter	.10 micron hydraulic filter
Electric system	
Battery	.12 volt
Interlocks	.Aux. valve neutral to start
Wheels & tires	
Standard rim	.9 x 7.00
Standard tires	.18 x 9.5-8
Controls	.Key, throttle, choke
Steering	.Zero-turning radius
Weight, no attachment	.1515 lbs. 687 kg)
Weight with std. Bucket	.1672 lbs. (758 kg)
Operating capacity	
With 200 lb. operator	.650 lbs. (295 kg)



FINN Skid Steer 250 Dimensions

A	Maximum operating height	.97.5" (248.6 cm)
B	Overall height of loader	.52" (132.1 cm)
C	Ground clearance	.5" (12.7 cm)
D	Wheel base	.30.5" (77.4 cm)
E	Overall length with no attachment	.65.5" (166.4 cm)
F	Overall length with std. Bucket	.87.25" (221.6 cm)
G	Maximum roll back (self leveling)	.50 degrees
H	Maximum down tilt	.36 degrees
I	Reach with bucket	.24.5" (69.9 cm)
J	Dump height (std. Bucket)	.51.75" (13.14 cm)
K	Bucket width (std. Bucket)	.40.5" (102.9 cm)
L	Loader width	
	Minimum (w/opt. tires)	.35.5" (90.2 cm)
	Maximum (w/std. tires)	.40.5" (102.9 cm)
M	Turning radius with bucket	.55" (139.7 cm)
N	Turning radius without bucket	.39.5" (100.3 cm)
O	Hinge pin height	.71.25" (180 cm)

PRE-START EQUIPMENT CHECK:



CAUTION: Equipment check is made with the engine off and all rotating parts stopped.

Safety check to insure operator safety:

1. Make sure that all guards are in place.
2. Lubricate equipment (see lube chart, page 12).
3. Check engine oil - refer to engine operator's manual.
4. Check that the tires are properly inflated.
5. Inspect and clean the hydraulic oil cooler if dirt is present.
6. Inspect the engine air cleaner (refer to the engine operator's manual).
7. Check fuel level. When filling the fuel tanks leave approximately 3/4" air gap from the top of the tanks so that the fuel has room to expand as it warms up. Do not fill the tanks completely full.

IMPORTANT: Only use clean, fresh unleaded gasoline with an octane rating of 87 or higher. Do not use gasoline left over from the previous season do not add oil to the gasoline or use fuel additives containing methanol or ethanol.

NOTE: This engine is not equipped with a spark arrestor muffler. Use or operation of this machine in the State of California on any forest-covered or unimproved grass-covered land, without an approved spark arrestor muffler, is a violation of the law. Other states may have similar laws.

STARTING PROCEDURE:



CAUTION: See safety section of the manual (pages 2-4) before operating the machine.

1. Stand on the operator's platform.
2. Make sure that the auxiliary attachment levers are off (center detent position).
3. Set throttle about 1/4 open.
4. Pull choke control out.
5. Turn key clockwise until the starter catches and engine fires. Keyswitch will automatically move to the run position.
6. Push choke control in for even running.

NOTE: This engine has a safety system which will shut the engine off if the oil pressure decreases below an acceptable level or if the engine temperature is too high.

OPERATION:

Think safety first! Please carefully read the Skid Steer safety summary section on pages 2-4 and all supplied safety information on all attachments before attempting to operate the machine. Closely following these instructions will help you and any bystanders avoid bodily injury, as well as prevent damage to the machine.

CONTROLS:

NOTE: It is very important to become familiar with all the controls in Figure 1 before you start the engine and operate the machine.



WARNING: Always keep both hands on the grip handles and both feet on the operator's platform whenever operating the machine.



WARNING: Always use a smooth motion whenever moving any control lever. Never jerk any of the control levers; this will result in the machine jerking, which could throw the operator from the machine.

IMPORTANT: For an individual's initial introduction to the machine, a level and open area free of hazards should be chosen to learn and practice safe operation. Do not attempt to do work with the unit until you are proficient in its operation. When first learning to use the machine only run the throttle up to about 2400-2600rpm. This will limit the amount of hydraulic fluid to the wheel motors allowing for slower and smoother operation. As the operator becomes more proficient the throttle can be increased for maximum potential of the machine.

NOTE: The left and right -side of the machine is determined as the operator stands on the platform facing forward.

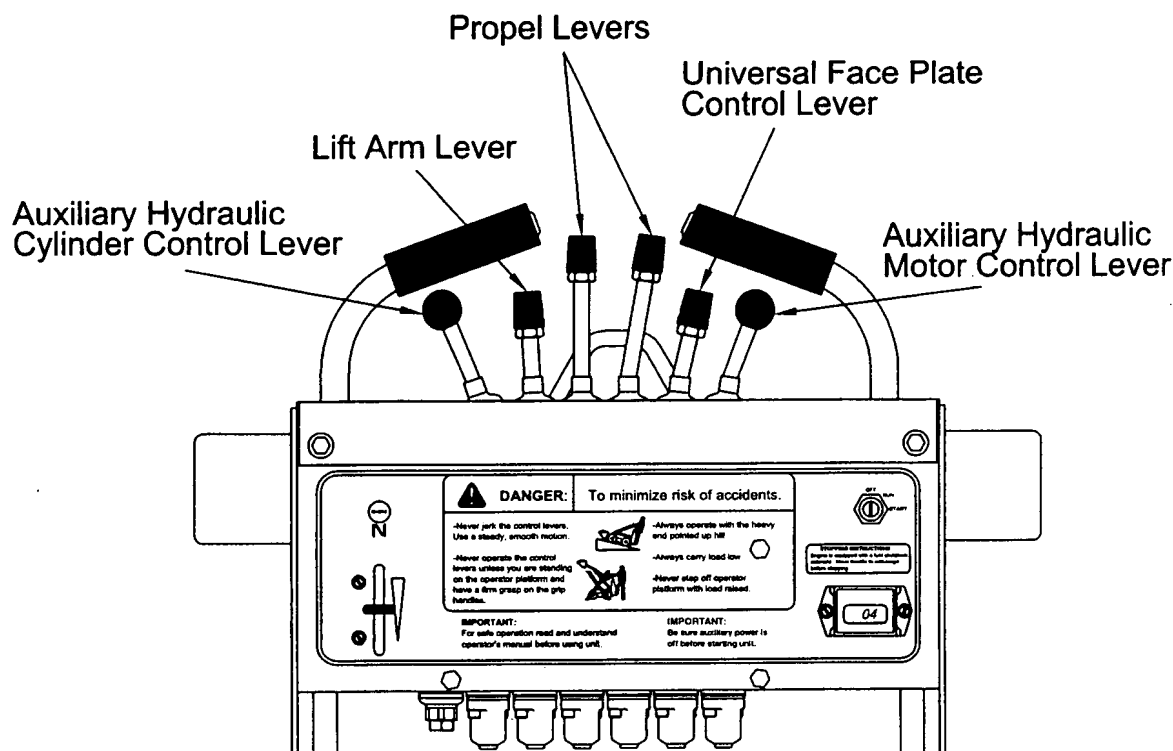


Figure 1

Propel:

To go forward, slowly push the propel levers forward. To drive straight equal pressure on both the right and left lever is required. To go straight forward push both right and left levers the same amount forward; the farther the levers are pushed forward the faster the machine will propel. To go straight reverse simply pull the levers back towards you. Always use a slow and gradual motion whenever operating the machine. Both of these levers are spring centered to return to neutral when the lever is released.

The machine is steered by moving one of the drive levers further forward than the other. For a gradual turn, to the left for example, move the right drive lever farther ahead of the left lever. The machine also has the capability to do a true "pivot steer", which allows the machine to pivot on its own radius. To accomplish this push one of the drive levers forward and pull the other drive lever an equal amount backwards. The farther the levers are pushed/pulled the faster this pivot turning will take place.

To slow or stop the machine, move the propel levers towards the center detent position to slow and allow to return to detent position to stop machine

Lift Arm:

To raise the lift arm simply pull the lift arm lever back towards you. To lower the lift arm, push the same lever forward away from you. This lever is spring centered to return to neutral when the lever is released.

Universal Face Plate Control:

To tilt the universal face plate and any connected attachment forward push the universal face plate control lever forward away from you. To curl the plate and attachment pull the lever back towards you. This lever is spring centered to return to neutral when the lever is released.

Auxiliary Hydraulics Control:

This unit is equipped with two auxiliary controls. One is used for attachments that have a hydraulic motor controlling them and the other one is used for attachments that are controlled with a hydraulic cylinder.

The auxiliary control lever that is on the right side of the machine (when facing forward) is the one used to control attachments with a hydraulic motor. This lever is friction detented in both directions so as to control the amount of oil that actually goes to the attachment. One direction will turn the motor forward and one will turn the motor in reverse. This lever is not spring centered so it is necessary to manually move it back to the center detent position which will turn the hydraulic motor that it is controlling off.

NOTE: The engine will not start if this lever is not in the center detent position.

The auxiliary control lever on the left side of the machine is used to control attachments with a hydraulic cylinder. This lever is spring centered to return to neutral when the lever is released. Pushing the lever one direction will extend the cylinder while pulling the lever in the opposite direction will retract the cylinder.

Leaving the Machine Unattended:

Whenever leaving the machine unattended, even if it is only for a few minutes, it is important that the main lifting arms are returned to the ground as close as possible, depending on which attachment is on the machine. Turn the ignition key to the "OFF" position to stop the engine. Be sure to remove the key from the ignition switch and take it with you so that any unauthorized personnel cannot start the machine.

Attachments:

The universal faceplate is designed to allow quick interchange with a variety of attachments. The attachments are held onto the machine by two spring-loaded locking pins. These pins simply rotate 180 degrees to lock and unlock any attachment. The following steps are the proper way to install any attachment.

IMPORTANT: Use only Finn authorized attachments. Other attachments may change the stability and operating characteristics of the unit. The machine warranty may be voided if unauthorized attachments are used.

Connecting Attachments:

1. Insure that the locking pins are in the unlocked position (pins facing outwards).
2. Start the engine.
3. Slowly tilt the universal load plate forward.
4. Move the machine forward so that the universal faceplate lines up with the adapter plate on the attachment.
5. Once the universal faceplate is inside the adapter plate on the attachment curl the universal faceplate all the way back and raise the loader arms slightly. The attachment should roll back onto the universal faceplate.
6. Turn the ignition key to the "OFF" position to stop the engine. Carefully step off platform to engage the attachment lock pins.
7. Rotate the locking pins to the locked position (pins facing inwards). Make sure that the locking pins are fully engaged by observing the locking pins sticking through the bottom of the adapter plate on the attachment.

If the attachment that is being connected is hydraulically driven proceed with the following steps. If it is not the engine may be started and the unit operated.

8. Move the auxiliary control levers back and forth to relieve any pressure in the auxiliary attachment lines.
9. Remove the protective covers that are on the auxiliary attachment quick disconnects. Connect the covers together to prevent contamination.
10. With a clean rag, wipe the ends of the hoses and inside the quick disconnects to prevent dirt from entering the hydraulic system.
11. Connect the hoses coming from the attachment to the quick disconnects on the machine.
12. Give the hoses a tug to confirm that they are properly connect to the quick disconnects.
13. Start the engine and begin operation of the machine.

Disconnecting Attachments:

1. Lower the attachment onto the ground or onto a trailer.
2. Turn the ignition "OFF" to stop the engine.
3. Move the auxiliary control lever back and forth to relieve any pressure in the auxiliary attachment lines.
4. Remove the attachment hoses from the machine and couple the hoses together to prevent contamination to the hydraulics during storage.
5. Install the protective covers onto the auxiliary attachment quick disconnects to prevent dirt from contaminating the hydraulic system.
6. Rotate the locking pins to the unlock position (pins facing outwards).
7. Start the engine.
8. Tilt the universal faceplate forward, and back the machine away from the attachment.

Hydraulic System:

The hydraulic system on the Finn SkidSteer 250 is designed to give trouble free service, if properly maintained. The most important areas of maintenance are the hydraulic fluid and filtration. The hydraulic reservoir holds 14.5 gallons of Mobil DTE-13M hydraulic fluid. The reservoir is filled by removing the vent plug at the top front of the reservoir and filling the reservoir with hydraulic fluid until it begins to seep out of the vent plug. Do not over fill the hydraulic reservoir. The reservoir was designed with extra room to allow the hydraulic fluid to expand as the temperature of the fluid increases. It is important not to substitute automotive oil as severe hydraulic damage may result to the hydraulic system. The hydraulic fluid should be replaced per the lubrication schedule, if the oil becomes milky, or if it gives off a burnt odor. The hydraulic oil filter must be replaced on schedule with a 10 micron filter– Finn part number #021618. When replacing the hydraulic oil filter be sure to lubricate the rubber gasket on the replacement filter. The hydraulic system relief is factory set at 3000 psi.

Using Cylinder Lock:



WARNING: Normal maintenance should be done with the lift arms lowered. If any maintenance or repairs have to be done that require the lift arms to be in the raised position, the cylinder lock must be used.

Installing the cylinder lock:

1. Start the engine and remove any attachment, which may be on the unit.
2. Raise the lift arm to the fully raised position.
3. Turn the ignition key off to stop the engine.
4. Remove the cylinder lock and the two snapper pins from the right fender.
5. Position the cylinder lock around the exposed rod of the right hand side cylinder and install the two snapper pins through the provided holes.
6. Start the engine.
7. Slowly lower the arms until the clevis on the cylinder comes in contact with the cylinder lock. This should sandwich the cylinder lock between the cylinder clevis and the cylinder body.
8. Turn the ignition key off to stop the engine.

Removing the cylinder lock:

1. Start the engine.
2. Raise the lift arms to the fully raised position.
3. Turn the ignition key off to stop the engine.
4. Remove the cylinder lock and two snapper pins from the cylinder and replace onto the holes provided on the right fender.
5. Start the engine and lower the lift arms to the ground.
6. Turn the ignition key to the off position to stop the engine.

CLEANING AND MAINTENANCE



CAUTION: Cleaning and maintenance is done with the engine off and all rotating parts stopped.

After First 4-8 Hours of Operation:

1. Retorque the wheel lug nuts (100 ft-lbs. (14 kg-m)).

Daily:

1. Remove any loose dirt from the machine. Be sure that the hydraulic oil cooler, the engine fan guard, and the engine oil cooler fins are free from dirt that will cause the hydraulic system and engine itself to run excessively hot.
2. Lubricate the Skid Steer per the lubrication chart on page 12.
3. Check the engine oil level. See engine manual.
4. Check the engine air filter. See engine manual.
5. Check tire pressure and condition – refer to inflation recommendation on tires.

Monthly:

1. Lightly lubricate the drive chain on each side of the machine. Jack up one side of the machine. Remove the tires and the chain guard. Apply a general-purpose oil onto the drive chain. Check that the chain tensioners (white plastic pieces) are pivoting freely and show no signs of abnormal wear. Replace the chain guard and the tires. Be sure to properly torque the lug nuts. Lower the machine back to the ground. Repeat on the other side.
2. Lubricate the Skid Steer per the lubrication chart on page 12.
3. Check the hydraulic oil level and top off as necessary.
4. Clean the engine air filter. See engine manual.
4. Visually inspect pivot pins for wear. Replace if necessary.
6. Check hydraulic lines and hoses for leaks, loose fittings, wear and deterioration. Immediately tighten any leaks or make any necessary repairs before operating.
7. Perform a good general inspection of machine and attachments. Repair or replace any worn or damaged parts. Keep equipment in good operating condition.

Annually:

1. Change the hydraulic oil and filter.
2. Paint any bare or scratched metal surfaces.
3. Check and tighten all fasteners.

LUBRICATION CHART

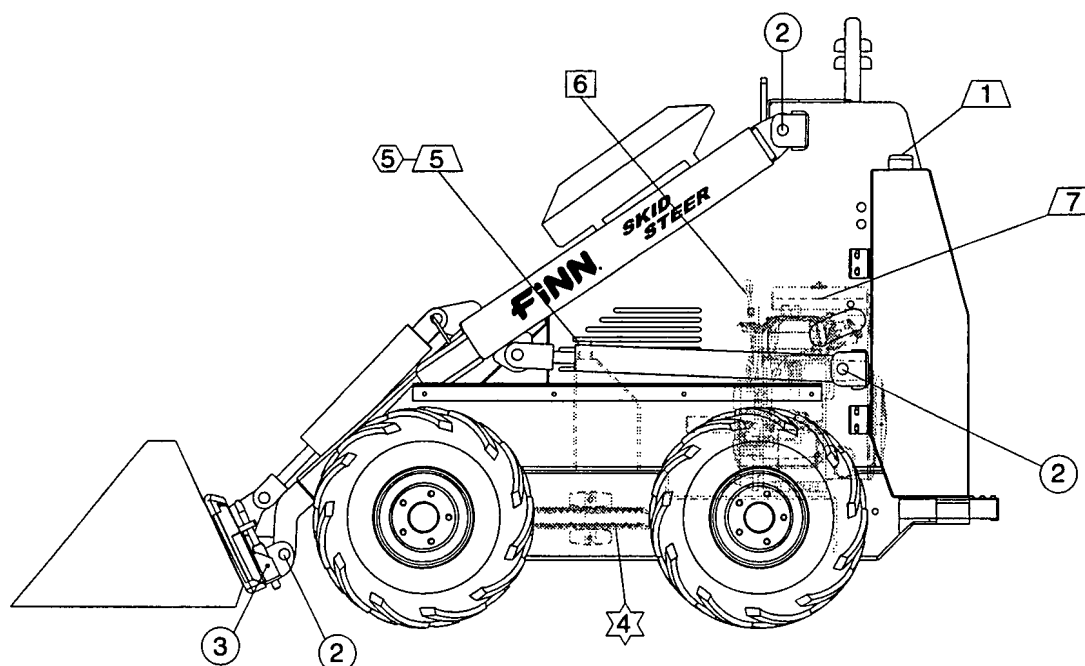







Figure 2

Ref. No.	Location	Lubricant	Frequency	Number
1	Check Fuel Level	FU	Daily	2
2	Lubricate Pivot Pins	CL	Weekly	6
3	Lubricate Quick Attach Pins	CL	Weekly	2
4	Lubricate Drive Chains	MO	Monthly	2
5	Check Hydraulic Oil Level	HO	Daily	1
	Change Hydraulic Oil and Filter	HO	Annually	1
6	Change Engine Oil and Filter	MO	See Engine Manual	1
	Check Engine Oil Level	MO	Daily	1
7	Check Engine Air Filter		Daily	1

LUBRICANT OR FLUID USED

CL	Chassis Lubricant
MO	Motor Oil SAE 15W-40
HO	Hydraulic Oil Mobil DTE-13M
FU	Gasoline

TIME KEY

DAILY (8 hours)	
WEEKLY (40 hours)	
MONTHLY (100 hours)	
ANNUALLY (1000 hours)	
SEE ENGINE MANUAL	

FLUID CAPACITIES

Fuel – 10.5 Gallons (40L)
Hydraulic Oil – 14.5 Gallons (55L)
Engine Oil – See Engine Manual

TROUBLE SHOOTING YOUR SKID STEER:

Problem	Probable Causes	Suggested Solutions
Engine:		
Starter does not crank.	Battery is dead.	Charge or jump-start the battery.
	Loose battery cable.	Tighten cable.
Engine will not start, starts hard, or fails to stay running.	Auxiliary control lever is not in neutral position.	Move lever to neutral.
	Fuel tanks empty.	Fill fuel tanks with gas.
	Choke is not on.	Pull choke cable out.
	Air cleaner is dirty.	Clean or replace.
	Dirt in fuel filter.	Replace fuel filter.
Engine loses power or overheats.	Spark plugs fouled or incorrectly gapped.	Install new spark plugs.
	Engine overloaded.	Reduce engine load.
	Engine oil level low.	Add oil to crankcase.
	Debris blocking air flow.	Remove debris.
Hydraulic System:		
Machine will not drive.	Hydraulic oil level low.	Add hydraulic oil.
	Drive chain worn or broken.	Repair or replace.
	Over center valves clogged.	Contact service dealer.

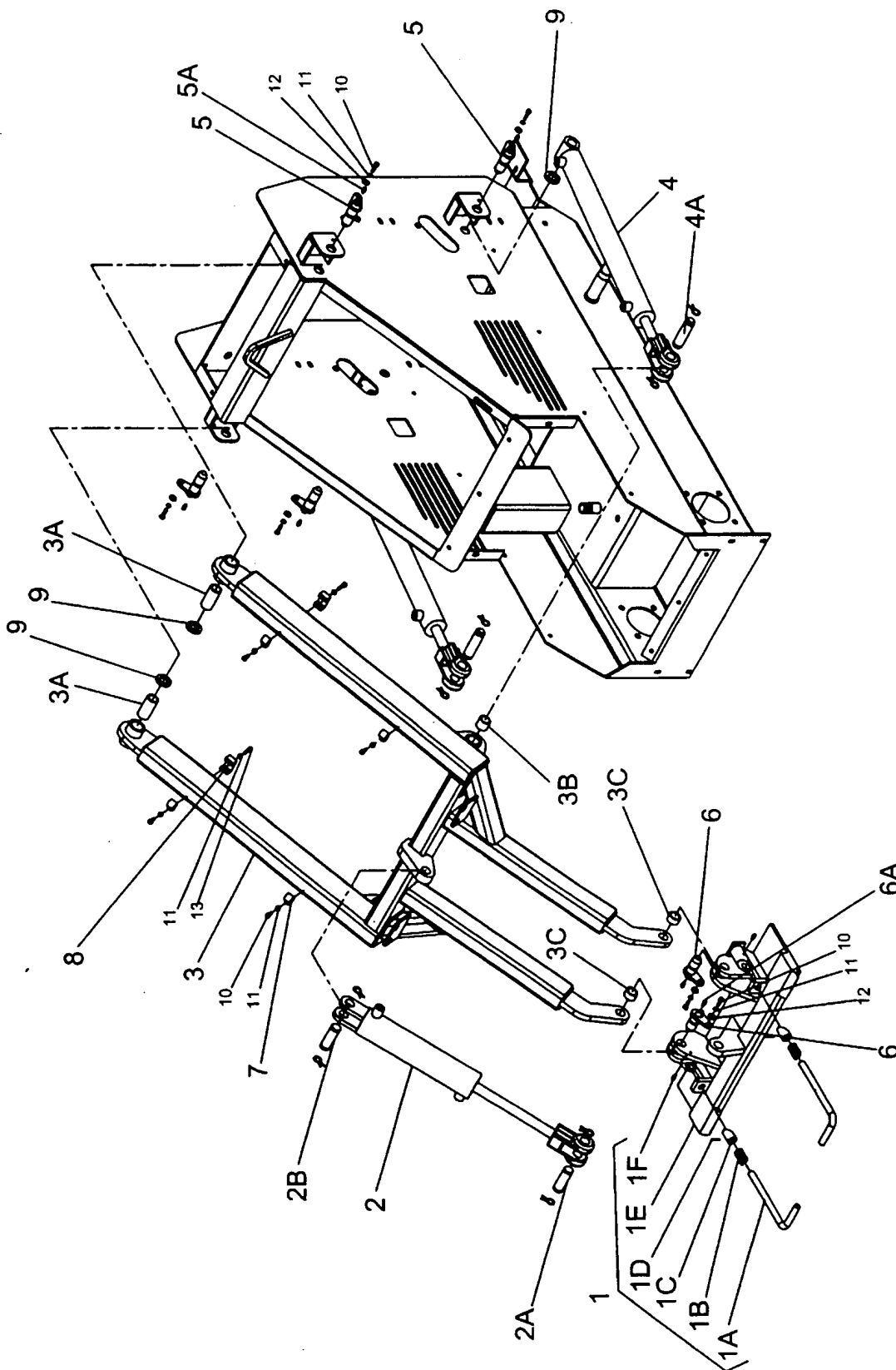
NOTES

NOTES

Eagle 250 Skid Steer

Parts Manual

Model SS



**WHEN ORDERING PARTS, BE SURE TO STATE
SERIAL NUMBER OF MACHINE**

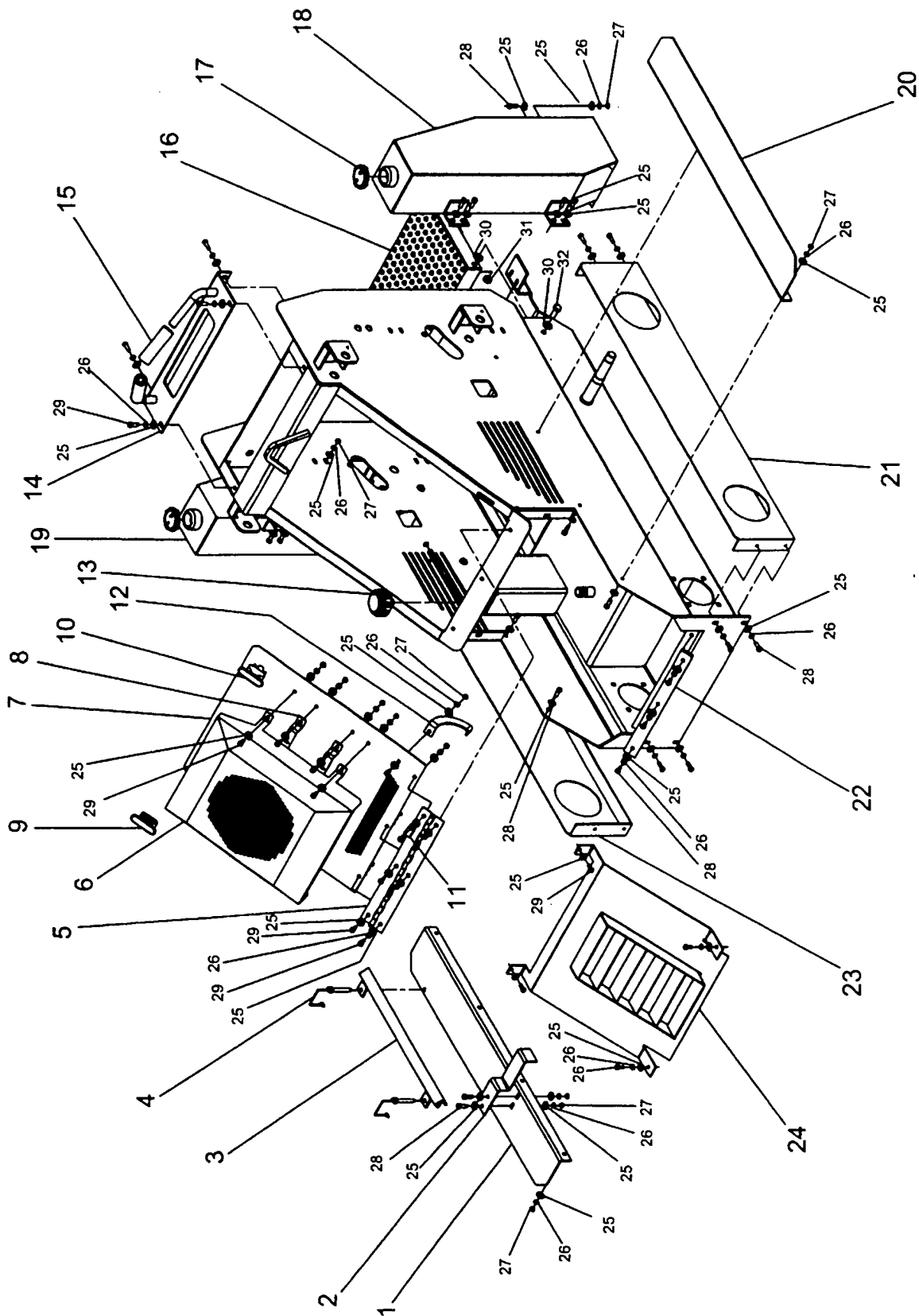
Parts Department: 1-800-229-8707

MAIN ARM ASSEMBLY

Ref. No.	Part Number	Description	No. Req'd
1	005682	Clutch/Pump Assembly	1
1	071111	Universal Face Plate Assembly	1
1A	071037-01	Locking Pin	2
1B	071114	Compression Spring	2
1C	071037-05	Locking Pin Boss	2
1D	071040	Roll Pin	2
1E	071050	Universal Face Plate	1
1F	021823	Grease Fitting	2
2	071127	Dump Cylinder	1
2A	071126P	Cylinder Pin – Long	1
2B	071127P	Cylinder Pin – Short	1
3	071117	Main Arm Weldment	1
3A	071122	Bronze Bushing	2
3B	071123	Bronze Bushing	2
3C	071118-05	Bronze Bushing	2
4	071126	Main Arm Cylinder	2
4A	071126P	Cylinder Pin – Long	2
5	071113-01	Long Pivot Pin	4
5A	080653	Grease Fitting	4
6	071113-02	Short Pivot Pin	2
6A	080653	Grease Fitting	2
7	008422	Hose Clamp	4
8	071106-08	Tubing Clamp	2
9	071146	Bronze Thrust Washer	4
10	X0412	1/4-20 UNC Hex Head Bolt x 3/4"Lg.	10
11	W04L	1/4" Lock Washer	12
12	W04F	1/4" Flat Washer	10
13	X0420	1/4-20 UNC Hex Head Bolt x 1-1/4" Lg.	2

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Parts Department: 1-800-229-8707



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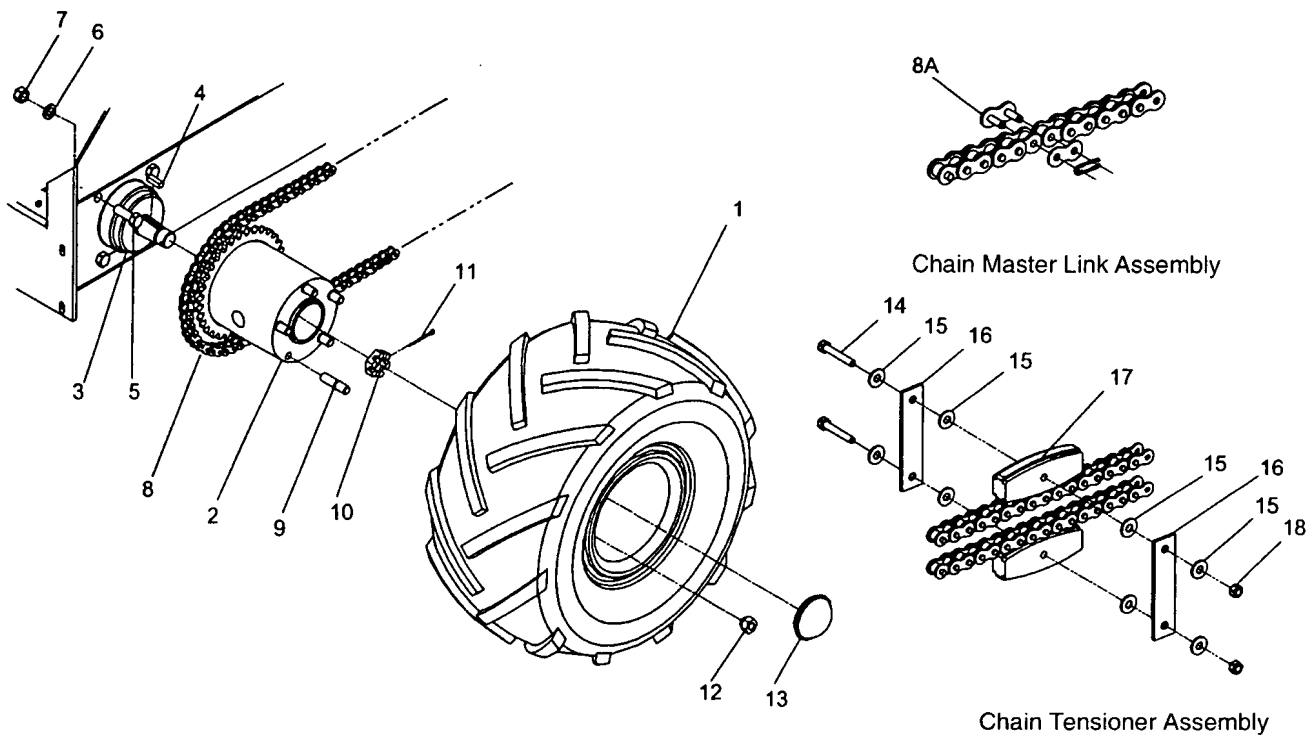
Parts Department: 1-800-229-8707

LOOSE PARTS ASSEMBLY

Ref. No.	Part Number	Description	No. Req'd
1	F250-0015	Fender	1
2	F250-0012	Battery Holddown	1
3	071155	Cylinder Lock	1
4	FW71225	Snapper Pin	2
5	071106-05	Door Hinge	1
6	F250-0028	Oil Cooler Guard	1
7	F250-0027	Oil Cooler Panel	1
	190044	1/8 x 1 Foam Gasket	36"
8	F250-0014-02	Oil Cooler Mount	2
9	071048	Cooler Panel Latch – Right Hand Side	1
10	071049	Cooler Panel Latch – Left Hand Side	1
11	060281	Wiring Clamp	1
12	F250-0014	Cooler Panel Stop Piece	1
13	004900	Filler Breather Cap	1
14	071008	Control Valve Cover Plate	1
15	071102	Foam Handle Grip	2
16	071107	Step	1
17	007914	Fuel Tank Cap	2
18	071104	Fuel Tank – Left Hand Side	1
19	071105	Fuel Tank – Right Hand Side	1
20	F250-0015	Fender	1
21	F250-0019-01	Chain Guard – Left Hand Side	1
22	071121	Main Arm Cushion Strap	1
23	F250-0019-02	Chain Guard – Right Hand Side	1
24	071129	Lower Louver Guard	1
25	W05F	5/16" Flat Washer	
26	W05L	5/16" Lock Washer	
27	Y05	5/16-18 UNC Hex Nut	
28	X0516	5/16-18 UNC Hex Head Bolt x 1" Lg.	
29	X0512	5/16-18 UNC Hex Head Bolt x 3/4" Lg.	
30	W08F	1/2" Flat Washer	
31	Y08L	1/2-13 UNC Lock Nut	
32	X0820	1/2-13 UNC Hex Head Bolt x 1-1/4" Lg.	

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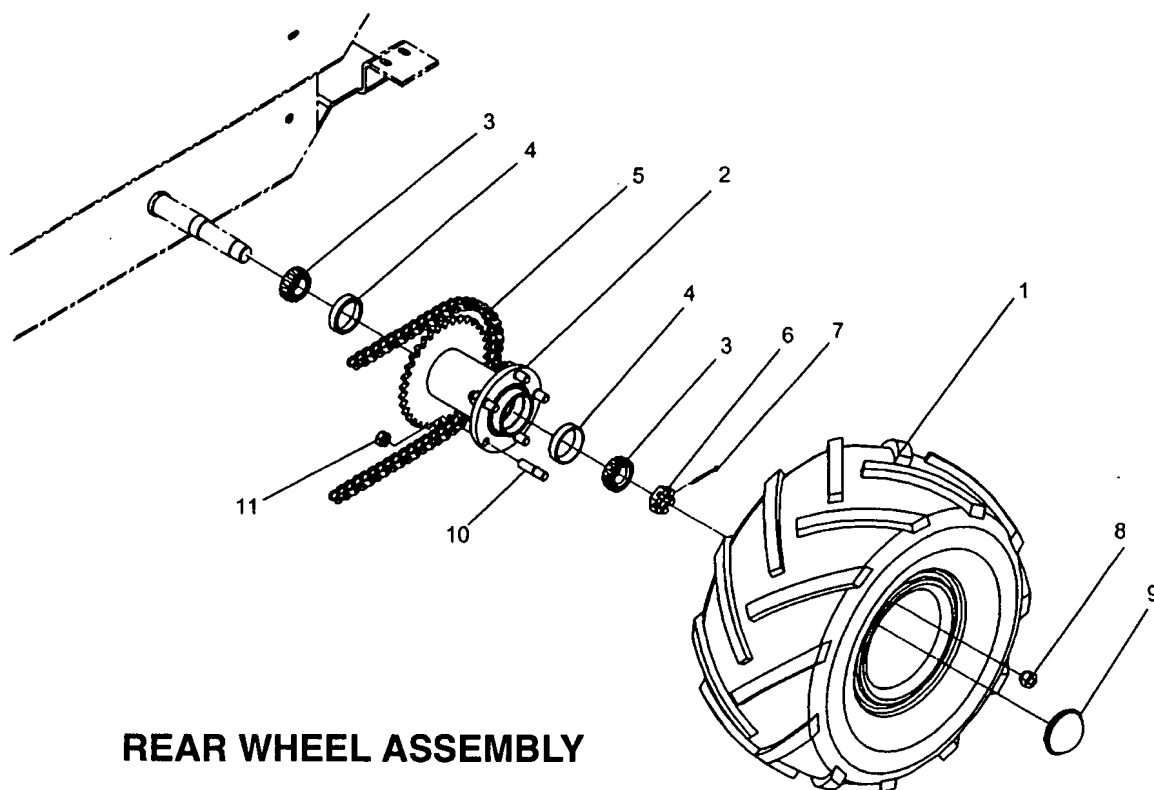


FRONT WHEEL ASSEMBLY

Ref. No.	Part Number	Description	No. Req'd
1	071131	Tire Assembly	2
	071130	Tire	2
	071112	Wheel	2
2	071027	Front Hub	2
3	071002	Hydraulic Wheel Motor	2
4	071002K	Wheel Motor Key	2
5	X0828	1/2-13 Hex Head Bolt x 1-3/4" Lg.	8
6	W06L	1/2" Lock Washer	8
7	Y06	1/2-13 Nut	8
8	071100	Drive Chain	2
8A	023751	Master Link	2
9	WL25-53	Wheel Stud	10
10	071002N	Slotted Nut	2
11	071014	Cotter Pin	2
12	WL6-80	Lug Nut	10
13	071019	Dust Cap	2
14	X0424	1/4-20 Hex Head Bolt x 1-1/2" Lg.	4
15	W04F	1/4" Flat Washer	16
16	071106-04	Chain Tensioner Strap	4
17	071011	Chain Tensioner	4
18	Y04L	1/4-20 Lock Nut	4
	F250-0019-01	Chain Guard – Left Hand Side	1
	F250-0019-02	Chain Guard – Right Hand Side	1

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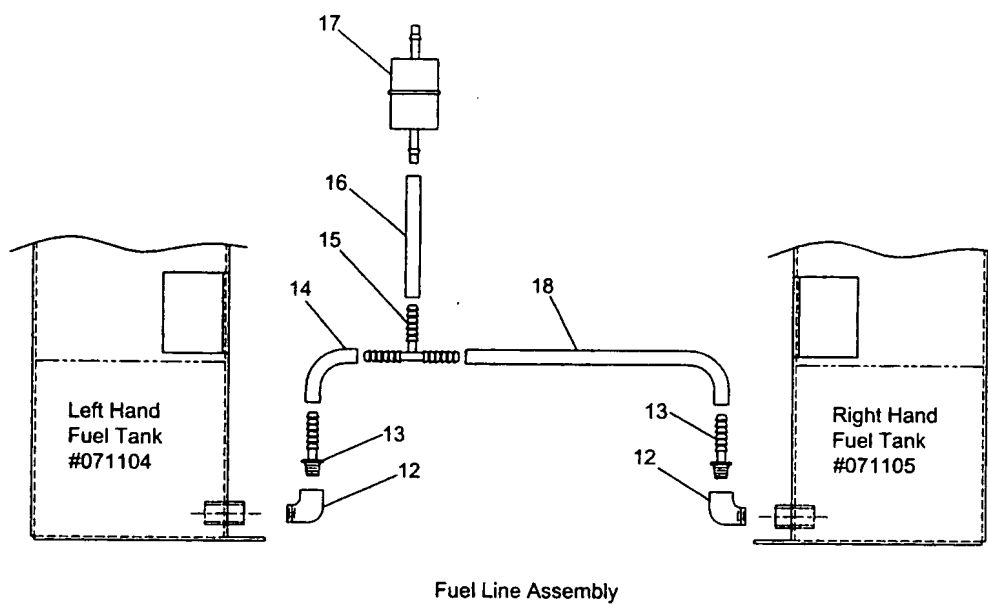
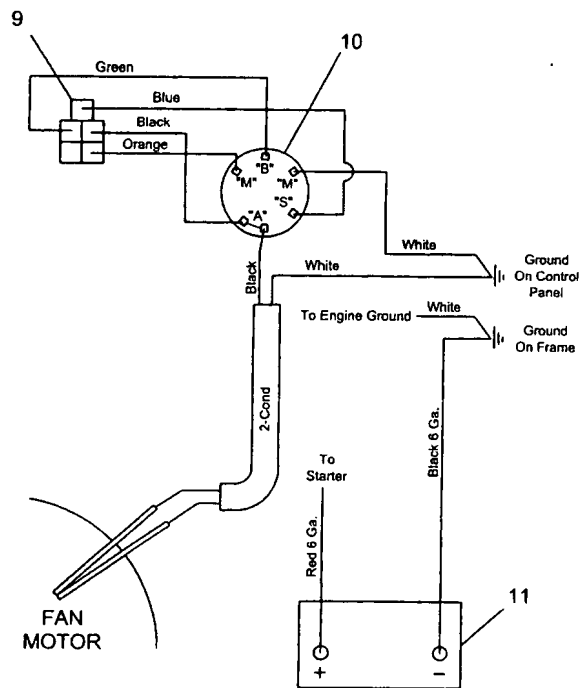
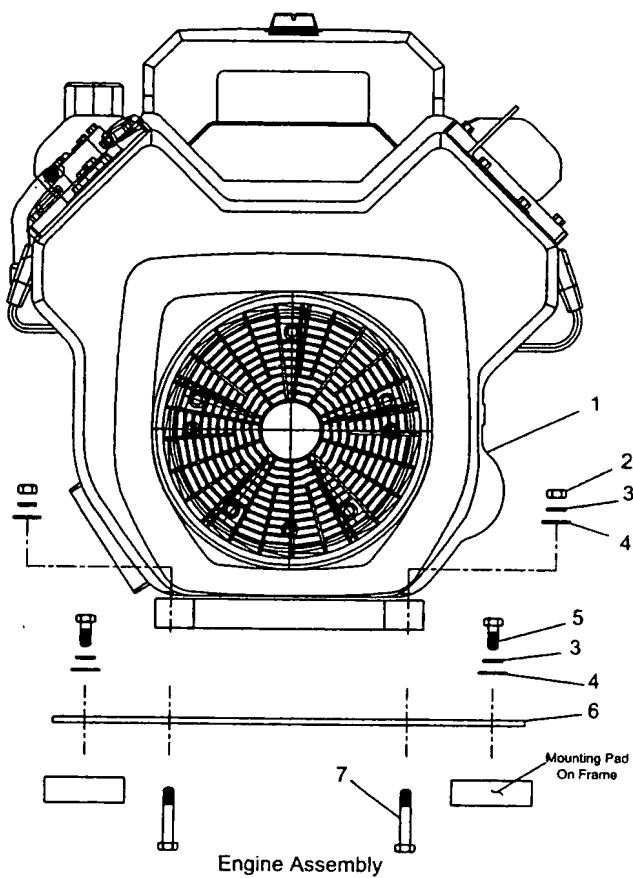


REAR WHEEL ASSEMBLY

Ref. No.	Part Number	Description	No. Req'd
1	071131	Tire Assembly	2
	071130	Tire	2
	071112	Wheel	2
2	071023	Rear Hub	2
3	071018	Bearing Cone	4
4	071017	Bearing Cup	4
5	071100	Drive Chain	2
6	071013	Slotted Nut	2
7	071014	Cotter Pin	2
8	WL6-80	Lug Nut	10
9	071019	Dust Cap	2
10	WL25-53	Wheel Stud	10
11	YF08J	1/2"-20 Jam Nut	10
	F250-0019-01	Chain Guard – Left Hand Side	1
	F250-0019-02	Chain Guard – Right Hand Side	1

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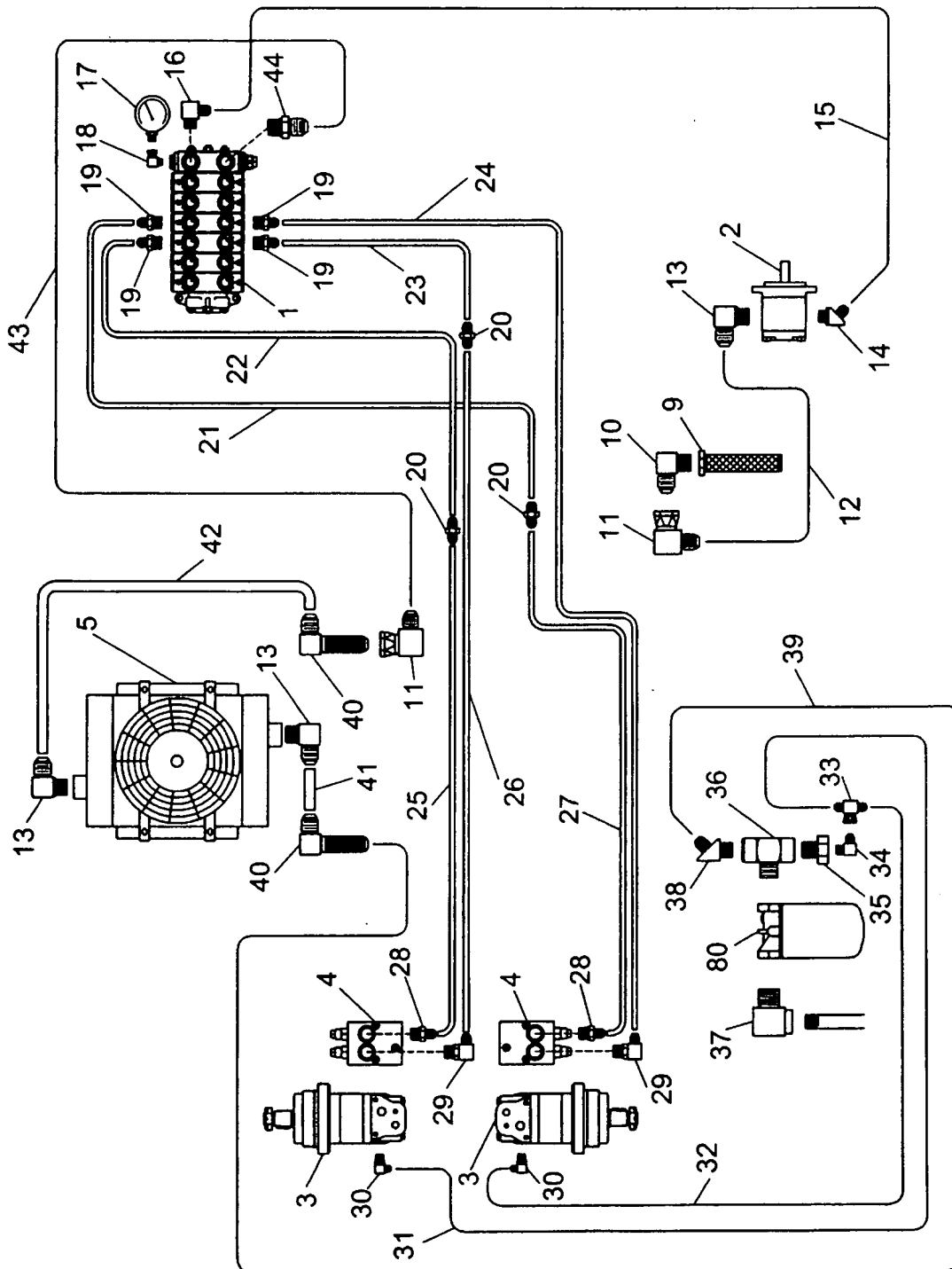
Parts Department: 1-800-229-8707

POWER SYSTEM

Ref. No.	Part Number	Description	No. Req'd
1	071007	25 HP Kohler Engine	1
	KL1205001	Oil Filter	1
	KL2408303	Air Cleaner Element	1
	KL2408305	Pre-Cleaner Element	1
	KL2406807	Muffler	1
	071147	Tail Pipe	1
	031421	Exhaust Pipe Clamp	1
	035026	Tini Tachometer	1
	071099	Throttle Cable	1
	071098	Choke Cable	1
2	Y05	5/16-18 Hex Nut	8
3	W05L	5/16 Lock Washer	8
4	W05F	5/16 Flat Washer	8
5	X0512	5/16-18 Hex Head Bolt x 3/4 Lg.	4
6	F250-0010	Engine Mounting Plate	1
7	X0528	5/16-18 Hex Head Bolt x 1-3/4 lg.	4
8	071144	Engine Wiring Assembly	1
9	KL2515506	Female Engine Plug	1
	KL4815501	Male Engine Plug	1
	170077	Male Terminals	4
	170078	Female Terminals	4
10	080654	Ignition Switch	1
11	GGF-235	Battery	1
12	007470	Street Elbow- 1/4	2
13	007476	Hose Barb Adapter- 1/4	2
14	190034	1/4 Fuel Line Hose	7"
	010321	Fuel Line Clamp	2
15	071090	Hose Barb Tee- 1/4	1
16	190034	1/4 Fuel Line Hose	13"
	010321	Fuel Line Clamp	2
17	KL2505002	In-line Fuel Filter	1
18	190334	1/4 Fuel Line Hose	29"
	010321	Fuel Line Clamp	2

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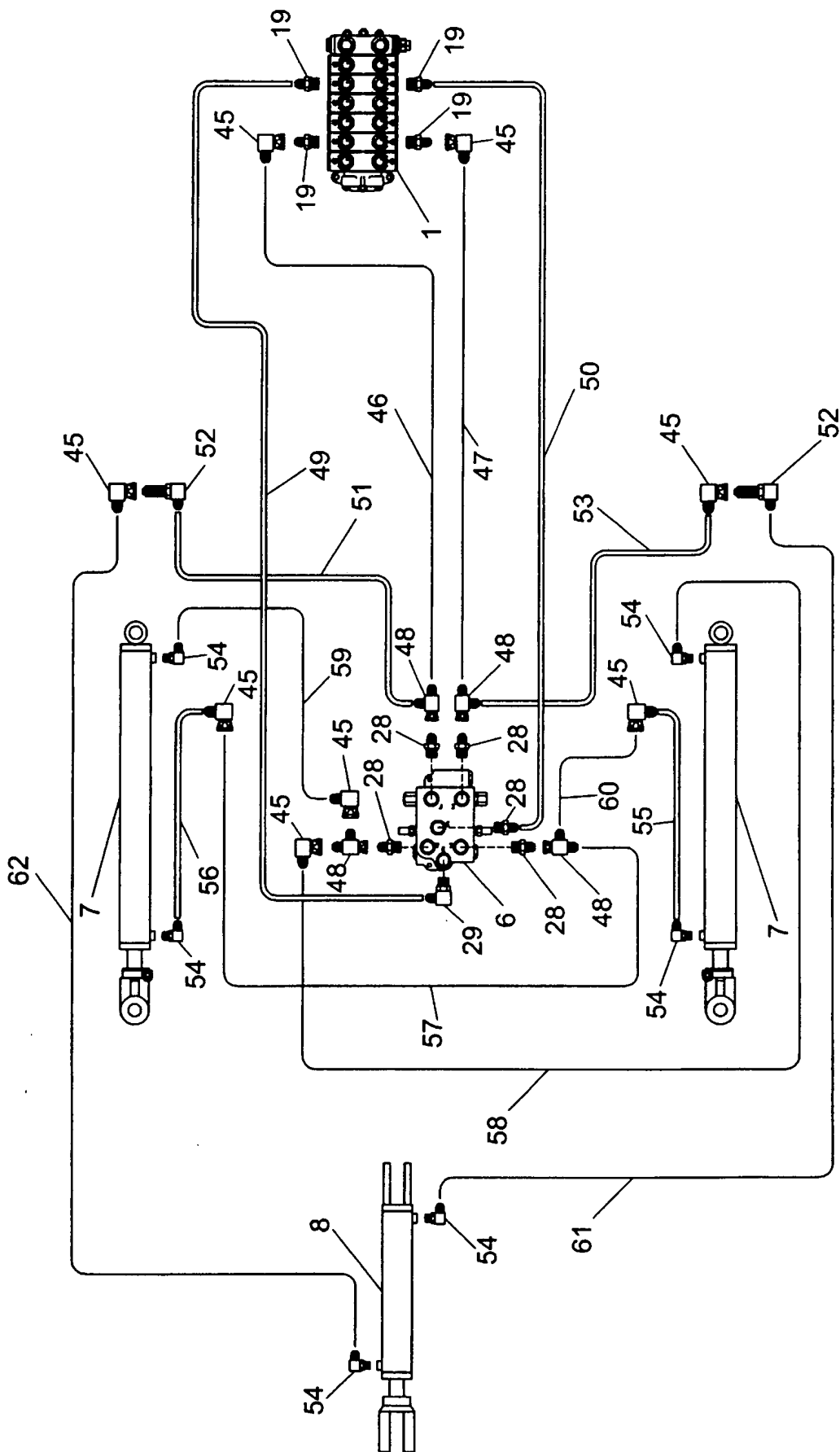
Parts Department: 1-800-229-8707

HYDRAULIC SCHEMATIC: Suction, Return & Propel

Ref. No.	Part Number	Description	No. Req'd
1	071000	Main Control Valve	1
2	071001	Hydraulic Pump	1
3	071002	Hydraulic Wheel Motor	2
4	071047	Over Center Valve	2
5	071045	Hydraulic Oil Cooler	1
9	004618	Suction Strainer	1
10	FW71591	90° Adapter Elbow	1
11	FW71492	90° Swivel Adapter Elbow	2
12	071074	Suction Hose	1
13	012091	90° Adapter Elbow	3
14	071125	45° Adapter Elbow	1
15	071075	Valve Inlet Hose	1
16	023621	90° Adapter Elbow	1
17	012044	Pressure Gauge	1
18	011929	90° Adapter Elbow Union	1
19	055231	Straight Adapter	4
20	071096	Straight Adapter	3
21	071059	Left "A" Motor Top Tube	1
22	071055	Right "B" Motor Top Tube	1
23	071057	Right "A" Motor Top Tube	1
24	071061	Left "B" Motor Tube	1
25	071056	Right "B" Motor Bottom Tube	1
26	071058	Right "A" Motor Bottom Tube	1
27	071060	Left "A" Motor Bottom Tube	1
28	085014	Straight Adapter	2
29	055309	90° Adapter Elbow	2
30	055274	90° Adapter Elbow	2
31	071077	Right Motor Case Drain Hose	1
32	071076	Left Motor Case Drain Hose	1
33	FW65218	Swivel Tee	1
34	FW71450	90° Adapter Elbow	1
35	011936	Reducer Bushing	1
36	011625	Tee	1
37	FW71715	Street Elbow	1
38	080649	45° Adapter Elbow	1
39	071138	Cooler Outlet Hose	1
40	071133	90° Bulkhead Fitting	2
41	071139	Lower Oil Cooler Tube	1
42	071140	Upper Oil Cooler Tube	1
43	071137	Cooler Inlet Hose	1
44	FW75198	Straight Adapter	1
80	021617	Return Filter Assembly	1
	021618	Return Filter Element	1

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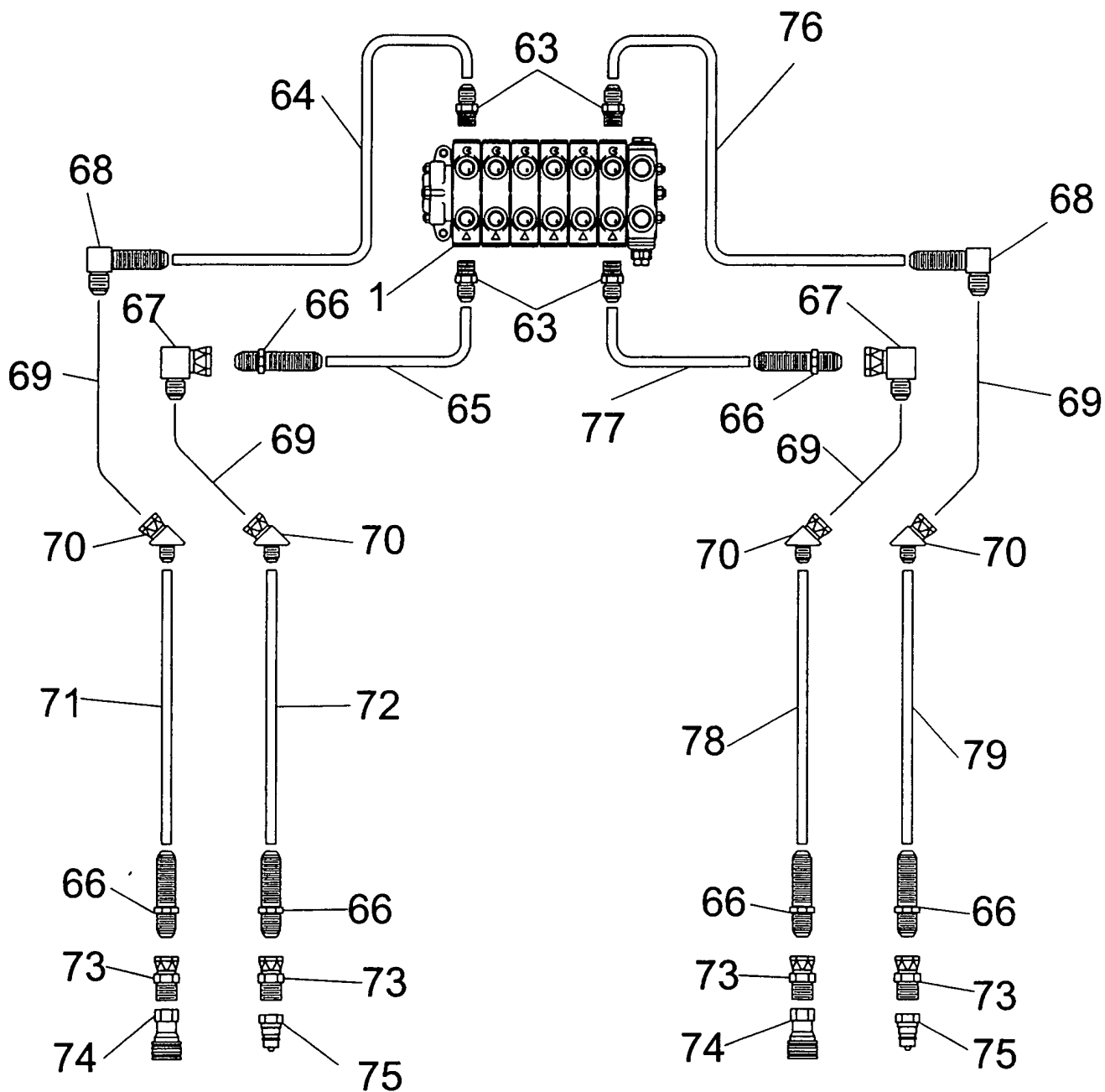
Parts Department: 1-800-229-8707

HYDRAULIC SCHEMATIC: Self Leveling Valve

Ref. No.	Part Number	Description	No. Req'd
1	071000	Main Control Valve	1
6	071046	Self-Leveling Valve	1
7	071126	Main Arm Lift Cylinder	2
8	071127	Bucket Dump/Curl Cylinder	1
19	055231	Straight Adapter	4
28	085014	Straight Adapter	5
29	055309	90° Adapter Elbow	1
45	FW71636	90° Swivel Adapter Elbow	8
46	071136	Bucket Curl Hose – Valve	1
47	071136	Bucket Dump Hose – Valve	1
48	FW71784	Swivel Tee	4
49	071062	Main Arm Raise Tube	1
50	071063	Main Arm Lower Tube	1
51	071066	Bucket Curl Tube – Cylinder	1
52	071094	90° Bulkhead Fitting	2
53	071067	Bucket Dump Tube – Cylinder	1
54	FW71448	90° Swivel Adapter Elbow	6
55	071068	Left Cylinder Tube	1
56	071069	Right Cylinder Tube	1
57	071081	Main Arm Lower Hose – Right Cylinder	1
58	071078	Main Arm Raise Hose – Left Cylinder	1
59	071080	Main Arm Raise Hose – Right Cylinder	1
60	071079	Main Arm Lower Hose – Left Cylinder	1
61	071083	Bucket Dump Hose	1
62	071084	Bucket Curl Hose	1

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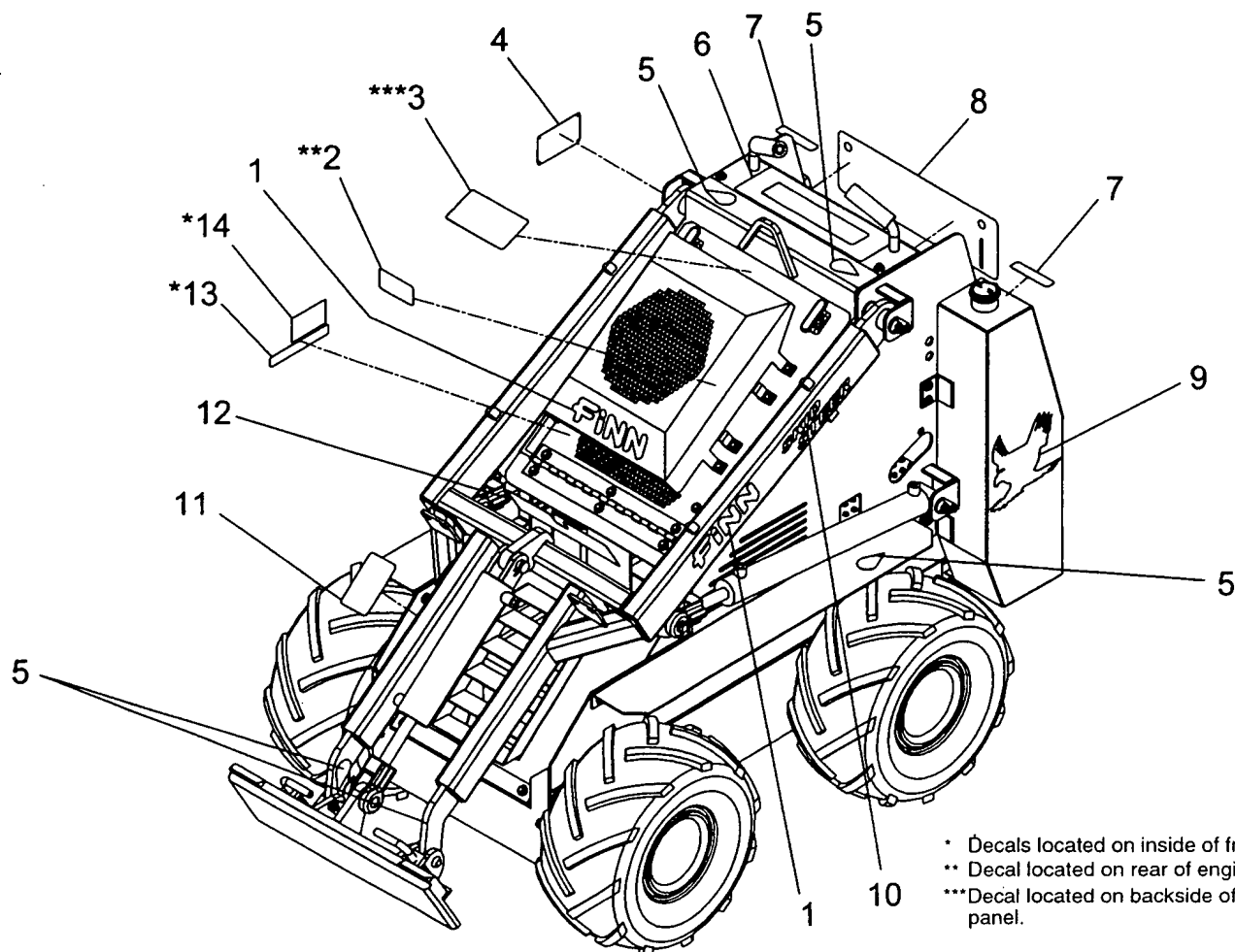
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HYDRAULIC SCHEMATIC: Attachments

Ref. No.	Part Number	Description	No. Req'd
1	071000	Main Control Valve	1
63	055232	Straight Adapter	4
64	071051	Right Top Attachment Tube	1
65	071052	Right Bottom Attachment Tube	1
66	031411	Straight Bulkhead Fitting	6
67	FW71870	90° Swivel Adapter Elbow	2
68	071093	90° Bulkhead Fitting	2
69	071082	Attachment Hose	4
70	FW71504	45° Swivel Adapter Elbow	4
71	071072	Right Outer Attachment Tube	1
72	071070	Right Inner Attachment Tube	1
73	071092	Straight Swivel Adapter	4
74	071088	Female Quick Disconnect	2
75	071089	Male Quick Disconnect	2
76	071064	Left Top Attachment Tube	1
77	071065	Left Bottom Attachment Tube	1
78	071071	Left Inner Attachment Tube	1
79	071073	Left Outer Attachment Tube	1
	071134	Plastic Female Cap	2
	071135	Plastic Male Plug	2

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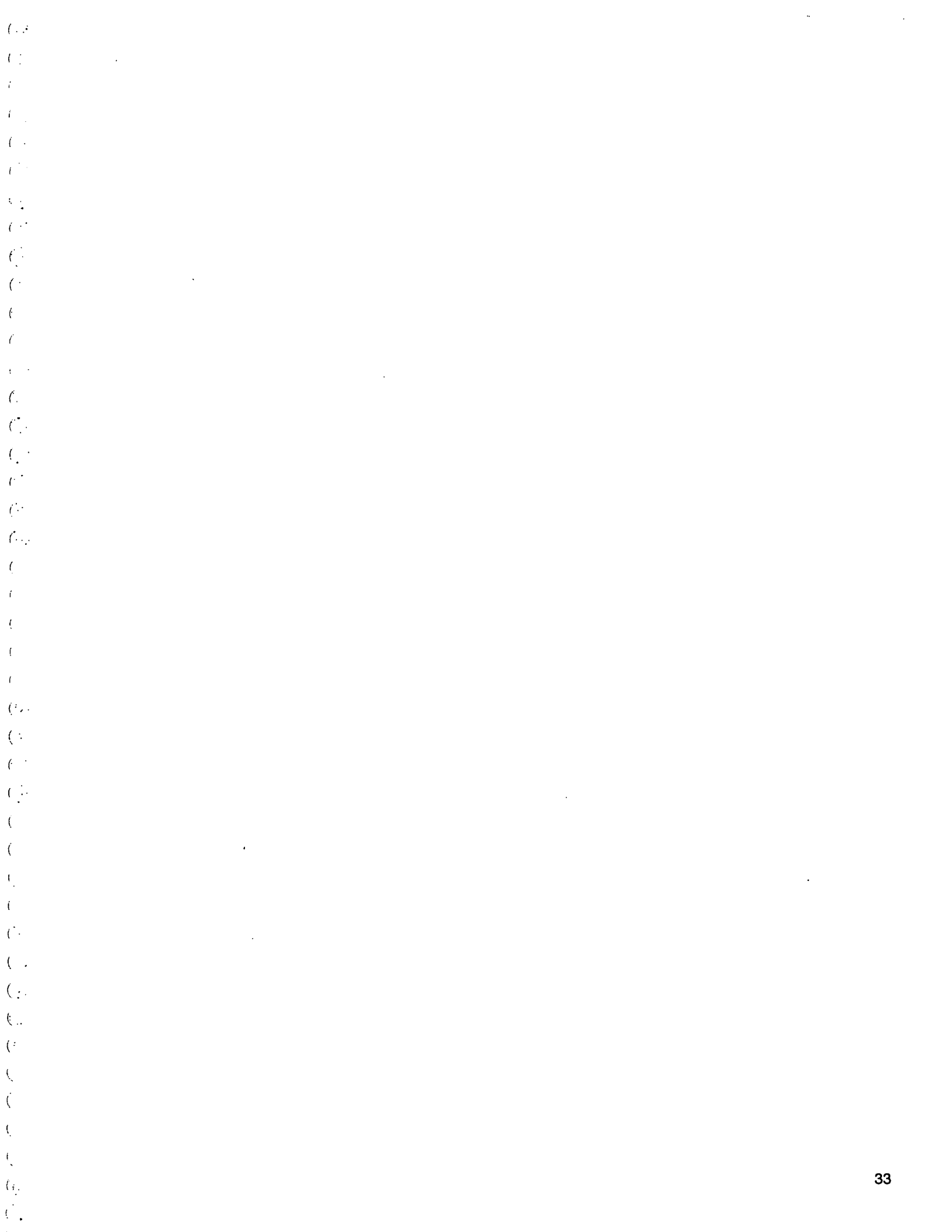


DECALS

Ref. No.	Part Number	Description	No. Req'd
1	031235	Small "FINN" Decal	3
2	012278	Decal "DANGER! Hot Exhaust"	1
3	022357	Decal "WARNING! Turn Off Engine..."	1
4	011690	FINN Nameplate	1
5	007231	Decal "Service Weekly"	6
6	071142	Control Valve Operation Decal	1
7	031331	Decal "Gasoline"	2
8	071141	SkidSteer Operation Decal	1
9	071150	Eagle 250 Decal	2
10	071149	Skid Steer Decal	2
11	012179	Decal "WARNING! Do Not Operate..."	1
12	071115	Decal "DANGER! Operating Instructions..."	1
13	012272	Decal "Hydraulic Fluid"	1
14	071145	Lubrication Plate	1

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Parts Department: 1-800-229-8707



WARRANTY

Finn warrants to the original Purchaser for use (or rental to others for use) all new construction machinery and attachments therefore manufactured by Finn to be free from defects in material and workmanship for a period of 12 months from date of purchase or 1200 hours of use, whichever comes first. Replacement parts provided under the terms of this warranty are warranted for the remainder of the warranty period applicable to the product in which installed, as if such parts were original components of that product. Finn makes no warranty with respect to (a) allied equipment or trade accessories not manufactured by it (such as, but not limited to tires, ignitions, starters, hose, batteries, magnetos, carburetors, engines or like or unlike equipment or accessories), such being subject to the warranty, if any, provided by their respective manufactures; or (b) secondhand, used, altered, or rebuilt machines. Further, the warranty herein expressed shall be rendered null and void to the extent any defect or failure of the products warranted hereby arises out of or is caused by accessories or component parts not manufactured or supplied by Finn, whether same are supplied by Purchaser, dealers or any other party. THE WARRANTY DESCRIBED IN THIS PARAGRAPH SHALL BE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Upon notification of Finn during the above-stated warranty period of any failure to conform to this warranty, and upon inspection by Finn to verify said nonconformity and verify the continuing existence of the warranty period, Finn will provide a new part or a repaired part, whichever Finn elects, to replace the part found to be defective. Such parts will be provided without charge to the Purchaser during normal working hours at a place of business of a Finn dealer or other establishment authorized by Finn to effect said repairs or replacements, but Purchaser shall bear all costs of transporting the product to and from such place of business or establishment. Correction of nonconformities, in the manner and for the period time provided above, shall constitute fulfillment of all liabilities of Finn under this contract.

THE REMEDIES OF THE USER SET FORTH HEREIN ARE EXCLUSIVE, WITHOUT REGARD TO WHETHER ANY DEFECT WAS DISCOVERABLE OR LATENT AT THE TIME OF DELIVERY OF THE PRODUCT TO THE PURCHASER.

The essential purpose of this exclusive remedy shall be to provide the Purchaser with repair or replacement of parts that prove to be defective within the period and under the conditions previously set forth. This exclusive remedy shall not have failed of its essential purpose (as that term is used in the Uniform Commercial Code) provided Finn remains willing to repair or replace defective parts within a commercially reasonable time after it obtains actual knowledge of the existence of a particular defect.

IN NO EVENT SHALL FINN BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL OR INDIRECT DAMAGES, INCLUDING LOST PROFITS OR LOST COMMERCIAL OPPORTUNITIES, WITH RESPECT TO THE SALE OF THE ABOVE WARRANTED PRODUCT OR ANYTHING DONE IN CONNECTION THEREWITH, OR FOR PROPERTY DAMAGE SUSTAINED BY A PERSON CLAIMING TO BE A THIRD PARTY BENEFICIARY OF A SURVIVING WARRANTY UNDER THE LAW OF ANY JURISDICTION.

NOTICE

FINN CORPORATION URGES THE USE OF ONLY FINN CORPORATION SUPPLIED PARTS AND ATTACHMENTS TO ASSURE PROPER PERFORMANCE AND SAFE OPERATION OF FINN CORPORATION EQUIPMENT. INSIST ON PARTS AND ATTACHMENTS MANUFACTURED OR SUPPLIED BY FINN CORPORATION WHEN YOU PURCHASE, REPAIR OR REPLACE YOUR FINN EQUIPMENT AND ATTACHMENTS. BECAUSE FINN CORPORATION CANNOT ASSURE THAT PARTS AND ATTACHMENTS NOT MANUFACTURED OR SUPPLIED BY FINN MEET FINN CORPORATION'S QUALITY STANDARDS, SPECIFICATIONS, OR OPERATING REQUIREMENTS, OUR WARRANTY IS NOT EFFECTIVE TO THE EXTENT ANY FAILURE OF OR DEFECT IN A FINN CORPORATION PRODUCT ARISES FROM OR IS CAUSED BY PARTS, ATTACHMENTS OR COMPONENTS NOT ORIGINATING WITH FINN CORPORATION. USE OF FINN CORPORATION EQUIPMENT WITH PARTS AND ATTACHMENTS NOT MANUFACTURED OR SUPPLIED BY FINN COULD RESULT IN PERSONAL INJURY.

Effective December 8, 1995

CALIFORNIA

Proposition 65 Warning

The engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

CALIFORNIA

Proposition 65 Warning

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

EQUIPMENT REGISTRATION

(SECOND OWNER)

To enable FINN CORPORATION to maintain a record of equipment owners for parts assistance, FINN information and other purposes, we request the completion and return of this form. THANK YOU FOR YOUR COOPERATION.

EQUIPMENT _____ MODEL _____ SERIAL # _____

DATE OF PURCHASE _____ PURCHASED FROM _____

NEW OWNER _____

PHONE () _____ FAX () _____ E-MAIL _____

STREET ADDRESS _____ MAIL ADDRESS _____

CITY _____ STATE _____ ZIP _____

DO YOU OWN OTHER FINN EQUIPMENT? ☐ YES ☐ NO

MODEL AND SERIAL NUMBER(S) _____

DO YOU OWN OTHER COMPETITIVE EQUIPMENT? ☐ YES ☐ NO BRAND _____

WHAT IS YOUR PRIMARY BUSINESS? _____

WHEN COMPLETED, PLEASE RETURN PROMPTLY. POSTAGE NOT REQUIRED.

EQUIPMENT REGISTRATION

(FIRST OWNER)

To enable FINN CORPORATION to maintain a record of equipment owners for parts assistance, FINN information and other purposes, we request the completion and return of this form. THANK YOU FOR YOUR COOPERATION.

EQUIPMENT _____ MODEL _____ SERIAL # _____

DATE OF PURCHASE _____ PURCHASED FROM _____

NEW OWNER _____

PHONE () _____ FAX () _____ E-MAIL _____

STREET ADDRESS _____ MAIL ADDRESS _____

CITY _____ STATE _____ ZIP _____

DO YOU OWN OTHER FINN EQUIPMENT? ☐ YES ☐ NO

MODEL AND SERIAL NUMBER(S) _____

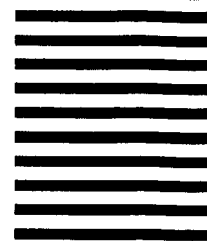
DO YOU OWN OTHER COMPETITIVE EQUIPMENT? ☐ YES ☐ NO BRAND _____

WHAT IS YOUR PRIMARY BUSINESS? _____

PLEASE COMPLETE THE FIRST OWNER REGISTRATION AND RETURN PROMPTLY. POSTAGE NOT REQUIRED.
SECOND OWNER COPY TO REMAIN IN PARTS MANUAL.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 6359 FAIRFIELD, OHIO

POSTAGE WILL BE PAID BY ADDRESSEE

**FINN CORP
9281 LESANT DR
FAIRFIELD OH 45014-9940**



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST-CLASS MAIL PERMIT NO. 6359 FAIRFIELD, OHIO

POSTAGE WILL BE PAID BY ADDRESSEE

**FINN CORP
9281 LESANT DR
FAIRFIELD OH 45014-9940**





Dingo 320-D

Traction Unit

Model Number 22303—990001 & Up

Operator's Manual

Exhibit E

Introduction

Thank you for purchasing a Toro product.

All of us at Toro want you to be completely satisfied with your new product, so feel free to contact your local Authorized Service Dealer for help with service, genuine replacement parts, or other information you may require.

Whenever you contact your Authorized Service Dealer or the factory, always know the model and serial numbers of your product. These numbers will help the Service Dealer or Service Representative provide exact information about your specific product. The two numbers are stamped into a plate mounted on left rear side of frame.

For your convenience, write the product model and serial numbers in the space below.

Model No: _____
Serial No. _____

Read this manual carefully to learn how to operate and maintain your product correctly. Reading this manual will help you and others avoid personal injury and damage to the product. Although we design, produce and market safe, state-of-the-art products, you are responsible for using the product properly and safely. You are also responsible for training persons, who you allow to use the product, about safe operation.

The warning system in this manual identifies potential hazards and has special safety messages that help you and others avoid personal injury, even death. DANGER, WARNING and CAUTION are signal words used to identify the level of hazard. However, regardless of the hazard, be extremely careful.



DANGER signals an extreme hazard that will cause serious injury or death if the recommended precautions are not followed.

WARNING signals a hazard that may cause serious injury or death if the recommended precautions are not followed.

CAUTION signals a hazard that may cause minor or moderate injury if the recommended precautions are not followed.

Two other words are also used to highlight information. "Important" calls attention to special mechanical information and "Note" emphasizes general information worthy of special attention.

The left and right side of the machine is determined by standing on the platform in the normal operator's position.

	WARNING:	
<p>The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.</p>		


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THE ENCLOSED ENGINE OWNER'S MANUAL IS SUPPLIED FOR CALIFORNIA EMISSION CONTROL REGULATION INFORMATION ON EMISSION SYSTEMS, MAINTENANCE AND WARRANTY.

KEEP THIS ENGINE OWNER'S MANUAL WITH YOUR UNIT. SHOULD THIS ENGINE OWNER'S MANUAL BECOME DAMAGED OR ILLEGIBLE, REPLACE IMMEDIATELY. REPLACEMENTS MAY BE ORDERED THROUGH THE ENGINE MANUFACTURER.

Safety

Improper use or maintenance by the operator or owner can result in injury. To reduce the potential for injury, comply with these safety instructions and always pay attention to the safety alert  symbol, which means CAUTION, WARNING, or DANGER—"personal safety instruction." Failure to comply with the instruction may result in personal injury or death.

Safe Operating Practices

This product is capable of amputating hands and feet. Always follow all safety instructions to avoid serious injury or death.



WARNING

POTENTIAL HAZARD

- Engine exhaust contains carbon monoxide, which is an odorless, deadly poison.

WHAT CAN HAPPEN

- Carbon monoxide can kill you and is also known to the State of California to cause birth defects.

HOW TO AVOID THE HAZARD

- Do not run engine indoors or in an enclosed area.

General Operation

- Read, understand, and follow all instructions in the operator's manual, in the video, and on the traction unit before starting. Also, read all attachment manuals where supplied
- Allow only responsible adults who are familiar with the instructions to operate the traction unit.
- Always wear long pants and substantial shoes. Wearing safety glasses, safety shoes, hearing protection, and a hard hat are advisable and may be required by some local ordinances and insurance regulations.
- Ensure that the area is clear of other people before operating the traction unit. Stop the traction unit if anyone enters the area.
- Never carry passengers on attachments or on the traction unit.
- Always look down and behind before and while backing.
- Do not place your feet under the platform.
- Slow down before turning. Sharp turns on any terrain may cause loss of control.
- Never leave a running traction unit unattended. Always lower the loader arms, stop the engine, and remove the key before dismounting.
- Do not exceed the rated operating capacity, as the traction unit may become unstable which may result in loss of control.
- Do not carry a load with the arms raised. Always carry loads close to the ground. Do not step off of the platform with the load raised.
- Do not over-load the attachment and always keep the load level when raising the loader arms. Logs, boards, and other items could roll down the loader arms, injuring you.
- Never jerk the control levers; use a steady motion.
- Keep your hands, feet, hair, and loose clothing away from any moving parts.
- Operate only in daylight or good artificial light.
- Do not operate the traction unit while under the influence of alcohol or drugs.

- Watch for traffic when operating near or crossing roadways.
- Use extra care when loading or unloading the traction unit onto a trailer or truck.
- Do not touch parts which may be hot from operation. Allow them to cool before attempting to maintain, adjust, or service.

Slope Operation

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution.

- Do not operate the traction unit on hillsides or slopes exceeding the angles recommended in the Stability Data section, page 11, and those in the attachment operator's manual. See also the slope chart on page 5.
- **Operate up and down slopes with the heavy end of the traction unit uphill.** Weight distribution changes. An empty bucket will make the rear of the traction unit the heavy end, and a full bucket will make the front of the traction unit the heavy end. Most other attachments will make the front of traction unit the heavy end.
- Raising the loader arms on a slope will affect the stability of the machine. Whenever possible, keep the loader arms in the lowered position when on slopes.
- Removing an attachment on a slope will make the rear of the traction unit heavy. Refer to the Stability Data section, page 11, to determine whether the attachment can be safely removed on the slope.
- Remove obstacles such as rocks, tree limbs, etc. from the work area. Watch for holes, ruts, or bumps, as uneven terrain could overturn the traction unit. Tall grass can hide obstacles.
- Use slow speed on slopes. Before starting the engine, put the pump selector lever in the slow (turtle) position so that you will not have to stop or shift while on the slope.
- Follow the recommendations in the attachment manuals for the use of counterweights to improve stability.
- Use only Toro approved attachments. Attachments can change the stability and the operating characteristics of the traction unit. Warranty may be voided if used with unapproved attachments.
- Keep all movements on slopes slow and gradual. Do not make sudden changes in speed or direction.
- Avoid starting or stopping on a slope. If tires lose traction, proceed slowly, straight down the slope.
- Check for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.
- Avoid turning on slopes. If you must turn, turn slowly and keep the heavy end of the traction unit uphill.
- Do not operate near drop-offs, ditches, or embankments. The traction unit could suddenly turn over if a wheel goes over the edge of a cliff or ditch, or if an edge caves in.
- Do not operate on wet grass. Reduced traction could cause sliding.
- Do not park the traction unit on a hillside or slope without lowering the attachment to the ground and chocking the wheels.
- Do not try to stabilize the traction unit by putting your foot on the ground.

Children

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the traction unit and the work activity. Never assume that children will remain where you last saw them.

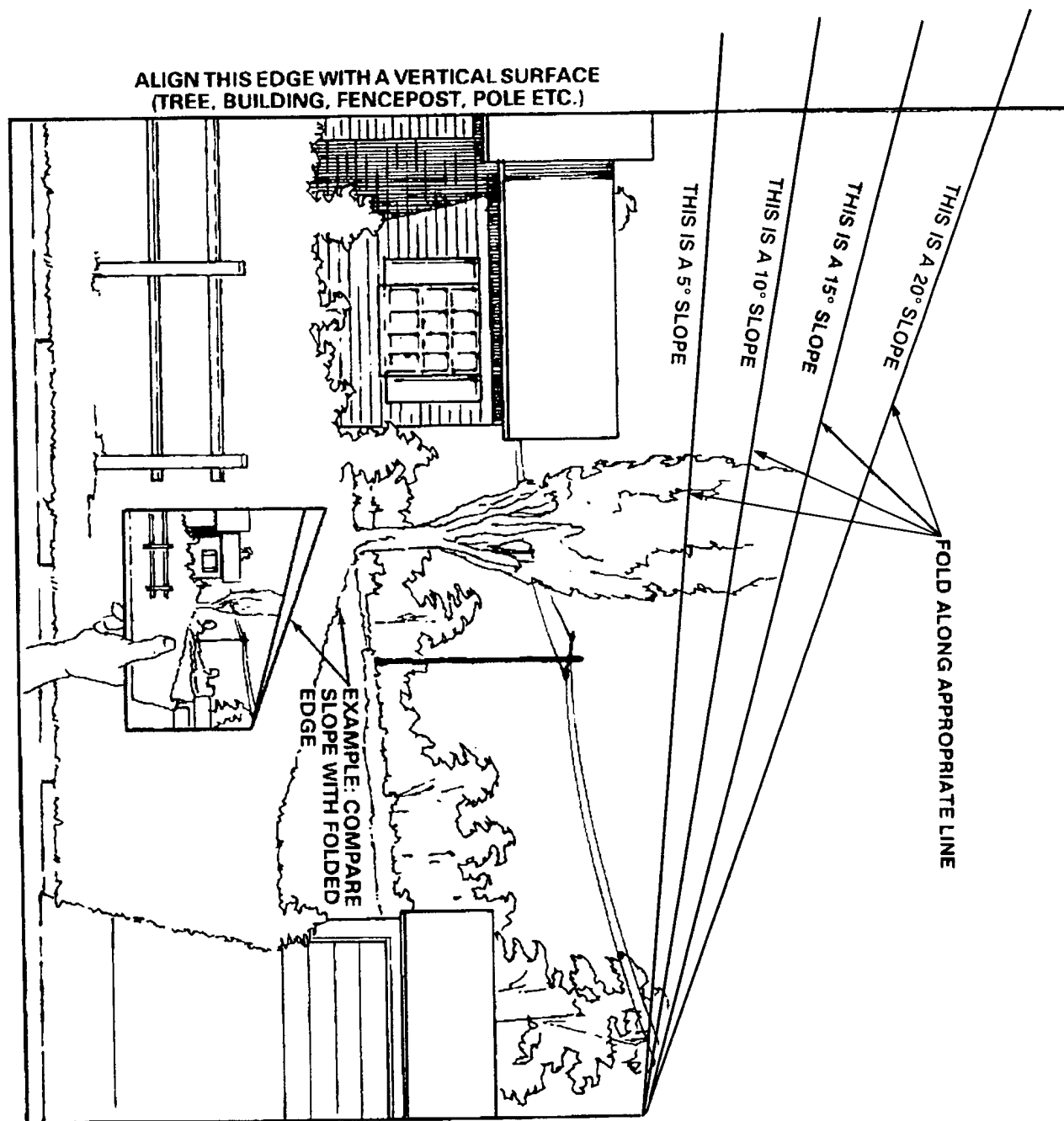
- Keep children out of the work area and under the watchful care of another responsible adult.
- Be alert and turn the traction unit off if children enter the area.
- Before and while backing, look behind and down for small children.
- Never carry children. They may fall off and be seriously injured or interfere with safe traction unit operation.
- Never allow children to operate the traction unit.
- Use extra care when approaching blind corners, shrubs, trees, the end of a fence, or other objects that may obscure vision.

Service

- Stop the engine before performing any service, repairs, maintenance, or adjustments.
- If any maintenance or repair requires the loader arms to be in the raised position, secure the arms in the raised position with the hydraulic cylinder locks included with traction unit.
- Never run a traction unit inside a closed area.
- Keep nuts and bolts tight. Keep equipment in good condition.
- Never tamper with safety devices. Check safety systems for proper operation before each use.
- Keep the traction unit free of grass, leaves, or other debris build-up. Clean up oil or fuel spillage. Allow the traction unit to cool before storing.

- Use extra care when handling fuel. It is flammable and vapors are explosive.
 - Use only an approved container.
 - Never remove the fuel cap or add fuel when the engine is running. Allow the engine to cool before refueling. Do not smoke.
 - Never refuel the traction unit indoors.
 - Never store the traction unit or fuel container inside where there is an open flame, such as near a water heater or furnace.
 - Never fill a container while it is inside a vehicle, trunk, pick-up bed, or any surface other than the ground.
 - Keep container nozzle in contact with the tank during filling.
- Stop and inspect the equipment if you strike an object. Make any necessary repairs before restarting.
- Use only genuine replacement parts to ensure that original standards are maintained.
- Battery acid is poisonous and can cause burns. Avoid contact with skin, eyes, and clothing. Protect your face, eyes, and clothing when working with a battery.
- Battery gases can explode. Keep cigarettes, sparks and flames away from the battery.
- Keep your body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid. Use cardboard or paper to find hydraulic leaks. Hydraulic fluid escaping under pressure can penetrate skin and cause injury requiring surgery within a few hours by a qualified surgeon or gangrene may result.

Slope Chart

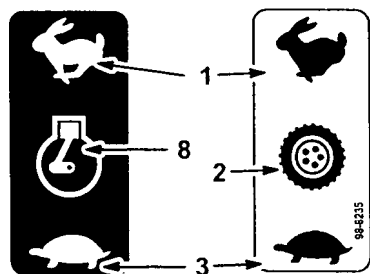


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Safety and Instruction Decals

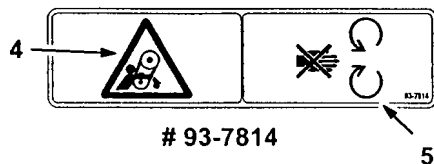


Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



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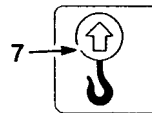
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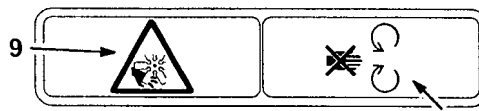
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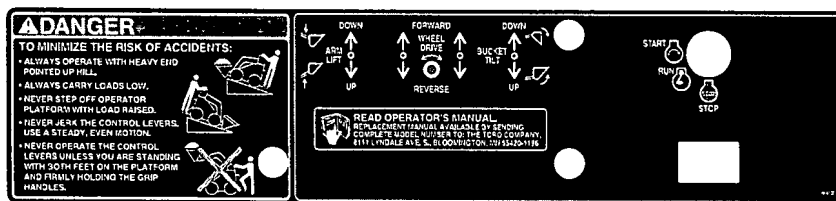


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Figure 1

- | | | | |
|-------------------|--------------------------------|-------------------------|------------------------------|
| 1. Fast | 4. Entanglement hazard | 6. Use only diesel fuel | 8. Engine speed |
| 2. Traction drive | 5. Stay away from moving parts | 7. Lift point | 9. Cutting hazard—moving fan |
| 3. Slow | | | |

Assembly

Loose Parts

Note: Use the chart below to verify that all parts have been shipped.

DESCRIPTION	QTY.	USE
Traction Unit	1	Install valve lever
Valve Lever	1	
Key	2	Start engine

Installing the Valve Lever

1. Thread the lever into the pump selector valve (Fig. 2).

Note: The lever should be installed with the bend toward the operator.

2. Tighten the jam nut on the lever to lock it in position.

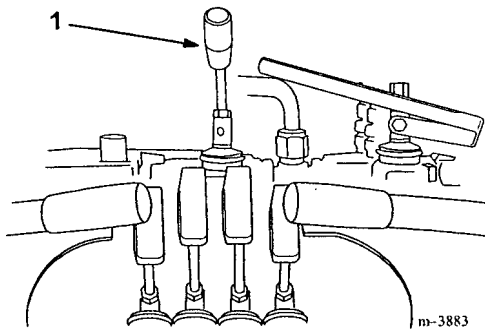


Figure 2

1. Pump selector lever

Activating the Battery

The traction unit is shipped with a dry battery. Bulk electrolyte with 1.260 specific gravity must be purchased from a local battery supply outlet.

1. Remove the four bolts securing the battery cover and remove the cover (Fig. 3)
2. Remove the nuts and bars securing the battery (Fig. 3).

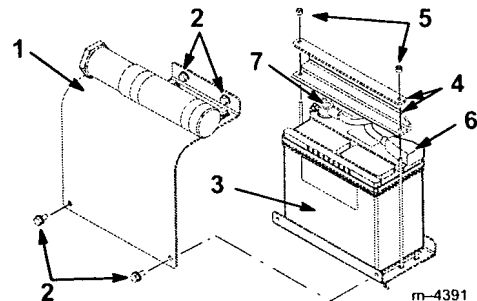


Figure 3

1. Battery cover
2. Bolt
3. Battery
4. Bars
5. Nut
6. Positive cable
7. Negative cable

3. Lift the battery off of its platform.

! DANGER

POTENTIAL HAZARD

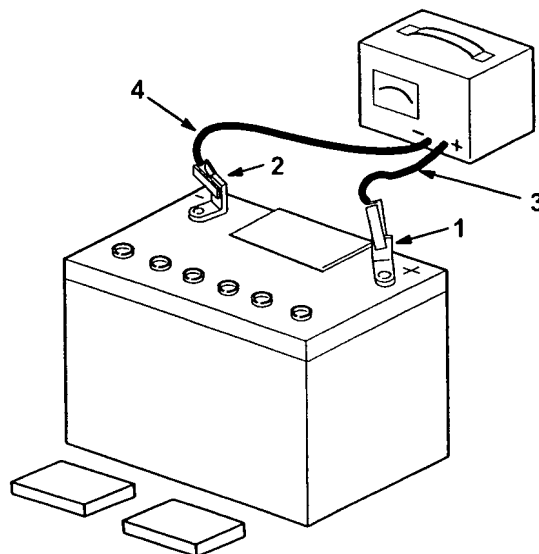
- Battery electrolyte contains sulfuric acid which is a deadly poison and it causes severe burns.

WHAT CAN HAPPEN

- If you drink electrolyte you could die, or, if it gets onto your skin, you will be burned.

HOW TO AVOID THE HAZARD

- Do not drink electrolyte and avoid contact with skin, eyes or clothing. Wear safety glasses to shield your eyes and rubber gloves to protect your hands.
- Fill the battery where clean water is always available for flushing the skin.
- Follow all instructions and comply with all safety messages on the electrolyte container.

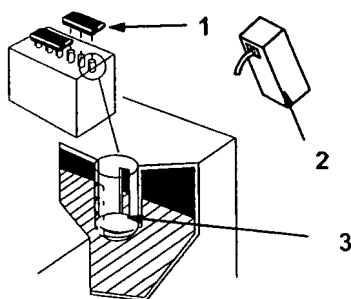


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Figure 5

- | | |
|------------------|---------------------------|
| 1. Positive post | 3. Charger red (+) wire |
| 2. Negative post | 4. Charger black (-) wire |

4. Remove the filler caps from the battery.
5. Slowly pour electrolyte into each cell until the electrolyte level is up to the lower part of the tube (Fig. 4).



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Figure 4

- | | |
|----------------|---------------------------|
| 1. Filler caps | 3. Lower part of the tube |
| 2. Electrolyte | |

6. Leave the covers off and connect a 3 to 4 amp battery charger to the battery posts (Fig. 5).

7. Charge the battery at a rate of 4 amperes or less for 4 hours (12 volts).

! WARNING

POTENTIAL HAZARD

- Charging the battery produces gasses.

WHAT CAN HAPPEN

- Battery gasses can explode.

HOW TO AVOID THE HAZARD

- Keep cigarettes, sparks, and flames away from the battery.

8. When the battery is fully charged, disconnect the charger from the electrical outlet and from the negative and positive battery posts (Fig. 5).
9. Slowly pour electrolyte into each cell until the level is once again up to the upper line on the battery case (Fig. 4) and install the covers.

10. Install the battery onto its platform (Fig. 3).
11. Secure the battery in the chassis with the bars and nuts removed previously (Fig. 3).
12. Connect the positive (red) cable to the positive (+) battery post (Fig. 3). Slide the rubber cover over the battery post.
13. Connect the negative (black) cable to the negative (–) battery post (Fig. 3).

Note: Ensure that the battery cables do not contact any sharp edges or each other.

14. Install the battery cover (Fig. 3).

Specifications

Note: Specifications and design are subject to change without notice.

Width	40.5 inches (103 cm)
Length	60 inches (152 cm)
Height	49 inches (125 cm)
Weight	1722 lbs (781 Kg)
Operating capacity (with a 200 lb operator)	515 lbs (234 Kg)
Tipping capacity (with a 200 lb operator)	1030 lbs (467 Kg)
Wheelbase	28 inches (71 cm)
Dump height (with standard bucket)	48.75 inches (124 cm)
Reach—fully raised (with the standard bucket)	26 inches (66 cm)
Height to hinge pin (with the standard bucket fully raised)	66 inches (168 cm)

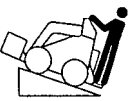

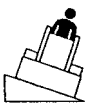
Attachments

Many attachments are available for use with the traction unit. These attachments allow you to perform many different functions with the traction unit such as hauling materials, digging holes, grading, and more. Contact your Toro dealer for a list of all approved SiteWork Systems attachments and accessories.

IMPORTANT: Use only Toro approved attachments.

Stability Data

The following table lists the maximum slope recommended for the traction unit in the positions listed in the table. Slopes over the listed degree may cause the traction unit to become unstable. The data in the table assumes that the loader arms are fully lowered and that the factory installed tires are on the traction unit, inflated to the recommended pressure; raised arms and other tire types or pressure may affect the stability.

Configuration	Maximum Recommended Slope when Operating with:		
	Front Uphill 	Rear Uphill 	Side Uphill 
Traction unit without attachment	7°	20°	17°
Traction unit with counterweight, without attachment	5°	21°	17°
Traction unit with an attachment rated with one of the following stability ratings for each slope position:*			
A	25°	25°	20°
B	18°	19°	18°
C	15°	16°	14°
D	10°	10°	9°
E	5°	5°	5°

* In each attachment manual is a set of three stability ratings, one for each hill position. To determine the maximum slope you can traverse with the attachment installed, find the degree of slope that corresponds to the stabilities ratings of the attachment.

Example: If the attachment installed on the traction unit has a Front Uphill rating of B, a Rear Uphill rating of D, and a Side Uphill rating of C, then you could drive forward up an 18° slope, rearward up a 10° slope, or sideways on a 14° slope, as listed in the above table.

Before Operating

Before operating, check the fuel and oil level, remove debris from the traction unit, and check the tire pressure. Also, ensure that the area is clear of people and debris. You should also know and have marked the locations of all utility lines.

Adding Fuel

The engine runs on clean, fresh diesel fuel with a minimum cetane rating of 40. Purchase fuel in quantities that can be used within 30 days to ensure fuel freshness.

Use summer grade diesel fuel (No. 2-D) at temperatures above 20° F (-7° C) and winter grade diesel fuel (No. 1-D or No. 1-D/2-D blend) below 20° F (-7° C). Use of winter grade diesel fuel at lower temperatures provides lower flash point and pour point characteristics, allowing easier starts and lessening the chances of chemical separation of the fuel due to lower temperatures.

Use of summer grade diesel fuel above 20° F (-7° C) will contribute toward longer life of the fuel pump components.

IMPORTANT: Do not use kerosene or gasoline in place of diesel fuel. Failure to observe this caution will damage the engine.

1. Park the traction unit on a level surface, lower the loader arms, and stop the engine.
2. Remove the key and allow the engine to cool.
3. Clean around the fuel tank cap and remove the cap.
4. Use a funnel and add diesel fuel to the fuel tank, until the level is 1/4 to 1/2 inch (6 mm to 13 mm) below the bottom of the filler neck.

Note: This space in the tank allows fuel to expand. Do not fill the fuel tank completely full.

5. Install the fuel tank cap securely. Wipe up any fuel that may have spilled.

If possible, fill the fuel tank after each use. This will minimize possible buildup of condensation inside the fuel tank.

DANGER

POTENTIAL HAZARD

- Under certain conditions fuel is extremely flammable and highly explosive.

WHAT CAN HAPPEN

- A fire or explosion from fuel can burn you, others, and cause property damage.

HOW TO AVOID THE HAZARD

- Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any fuel that spills.
- Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 1/4 to 1/2 in. (6 to 13 mm) below the bottom of the filler neck. This empty space in the tank allows fuel to expand.
- Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.
- Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply.

Draining Water from the Fuel Filter

Drain water or other contaminants from the fuel filter daily.

1. Stop the engine and remove the key.
2. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
3. Turn the drain valve until the water runs out of the filter (Fig. 6).

Note: The fuel filter is located near the bottom of the fuel tank.

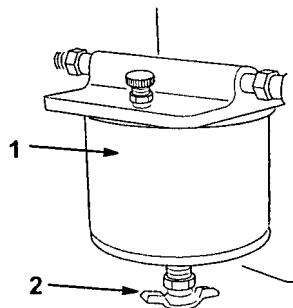


Figure 6

1. Fuel filter 2. Drain valve

m-3708

4. Close the valve.
5. Close the rear access cover.

Checking the Oil Level

1. Park the traction unit on a level surface, lower the loader arms, and stop the engine.
2. Remove the key and allow the engine to cool.

3. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
4. Clean around the oil dipstick (Fig. 7).
5. Pull out the dipstick and wipe the metal end clean (Fig. 7).
6. Slide the dipstick fully into the dipstick tube (Fig. 7).
7. Pull the dipstick out and look at the metal end.
8. If the oil level is low, clean around the oil filler cap and remove the cap (Fig. 7).
9. Slowly pour only enough oil into the valve cover to raise the level to the F (full) mark.

IMPORTANT: If you overfill the crankcase with oil, the excess oil may damage the engine.

10. Replace the filler cap and dipstick.

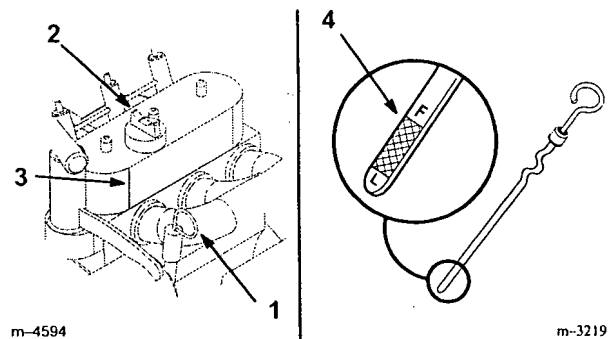


Figure 7

1. Oil dipstick 3. Valve cover
2. Filler cap 4. Metal end

11. Close the rear access cover.

Checking the Cooling System

The cooling system is filled with a 50/50 solution of water and permanent ethylene glycol anti-freeze. Check the level of coolant at the beginning of each day, before starting the engine.

DANGER

POTENTIAL HAZARD

- Coolant is hot and pressurized.

WHAT CAN HAPPEN

- Discharge of hot pressurized coolant can cause severe burns.

HOW TO AVOID THE HAZARD

- Do not remove the radiator cap when the engine is hot. Always allow the engine to cool at least 15 minutes or until the radiator cap is cool enough to touch without burning your hand before removing it.

1. Park the traction unit on a level surface, lower the loader arms, and stop the engine. Remove the key.
2. Allow the engine to cool.
3. Remove the radiator filler cap and check the coolant level (Fig. 8). The coolant should be up to filler neck.
4. If coolant level is low, replenish the system.

IMPORTANT: Do not over fill the radiator.

5. Replace the radiator filler cap, ensuring that it is tightly sealed.

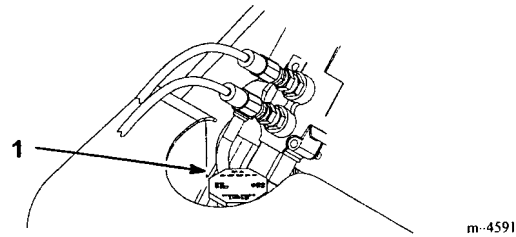


Figure 8

1. Filler Cap

Removing Debris from the Traction Unit

IMPORTANT: Operating the engine with a blocked radiator, may result in engine damage from overheating.

1. Park the traction unit on a level surface, raise the loader arms, and install the cylinder locks; refer to Using the Cylinder Locks, page 22.
2. Stop the engine and remove the key.
3. Remove the front access cover, refer to Removing the Front Access Cover, page 26.
4. Clean any debris from the grill.
5. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
6. Wipe away debris from the air cleaner.
7. Clean any debris build-up on the engine with a brush or blower before each use.

IMPORTANT: It is preferable to blow dirt out, rather than washing it out. If water is used, keep it away from electrical items and hydraulic valves. Do not use a high-pressure washer. High-pressure washing can damage the electrical system and hydraulic valves or deplete grease.

8. Replace and secure the front and rear access covers.

9. Remove and store the cylinder locks (refer to Using the Cylinder Locks, page 22), and lower the loader arms.

Checking the Hydraulic Fluid

Check the hydraulic fluid level before the engine is first started and after every 25 operating hours.

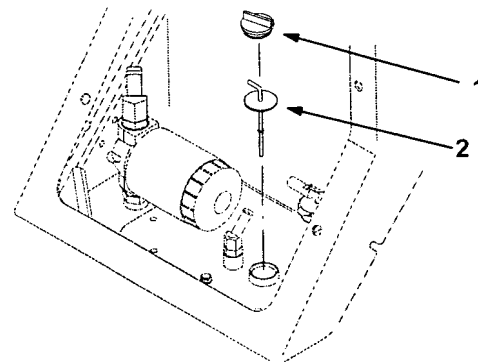
Hydraulic Tank Capacity: 17.25 gal. (67 l)

Use only Group 1 ISO type 46/68 anti-wear hydraulic fluids, recommended for ambient temperatures consistently below 100°F (38°C), such as Toro Hy-Pro, Mobil Fluid 424, or other equivalent fluid.

IMPORTANT: Use only the group 1 ISO type 46/68 anti-wear hydraulic fluids. Other fluids could cause system damage.

1. Remove the attachment, if one is installed; refer to Removing an Attachment, page 24.
2. Park the traction unit on a level surface, raise the loader arms, and install the cylinder locks; refer to Using the Cylinder Locks, page 22.
3. Stop the engine and remove the key.
4. Remove the front access cover, refer to Removing the Front Access Cover, page 26.
5. Clean the area around the filler neck of the hydraulic tank (Fig. 9).
6. Remove the cap from the filler neck and check the fluid level on the dipstick (Fig. 9).

The fluid level should be 1/2 to 3/8 inches (10 to 15 mm) below the mark on the dipstick when the loader arms are raised. If the loader arms are lowered, the fluid level should be at the mark on the dipstick.



m-4596

Figure 9

1. Filler neck cap

2. Dipstick

7. If the level is low, add enough fluid to raise it to the proper level.
8. Install the cap on the filler neck.
9. Install the front access cover.
10. Remove and store the cylinder locks (refer to Using the Cylinder Locks, page 22) and lower the loader arms.

Tire pressure

Maintain the air pressure in the tires as specified. Check the tires when they are cold to get the most accurate reading.

Pressure: 15–20 psi (103–138 kPa)

Note: Use a lower tire pressure (15 psi/ 103 kPa) when operating in sandy soil conditions to provide better traction in the loose soil.

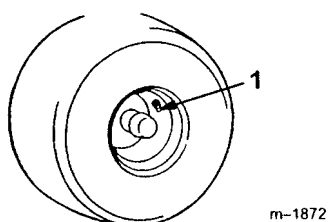


Figure 10

1. Valve stem

Operation

Traction Unit Overview

Figure 11 contains a front and back view of the traction unit. Familiarize yourself with all of the traction unit components listed in Figure 11.

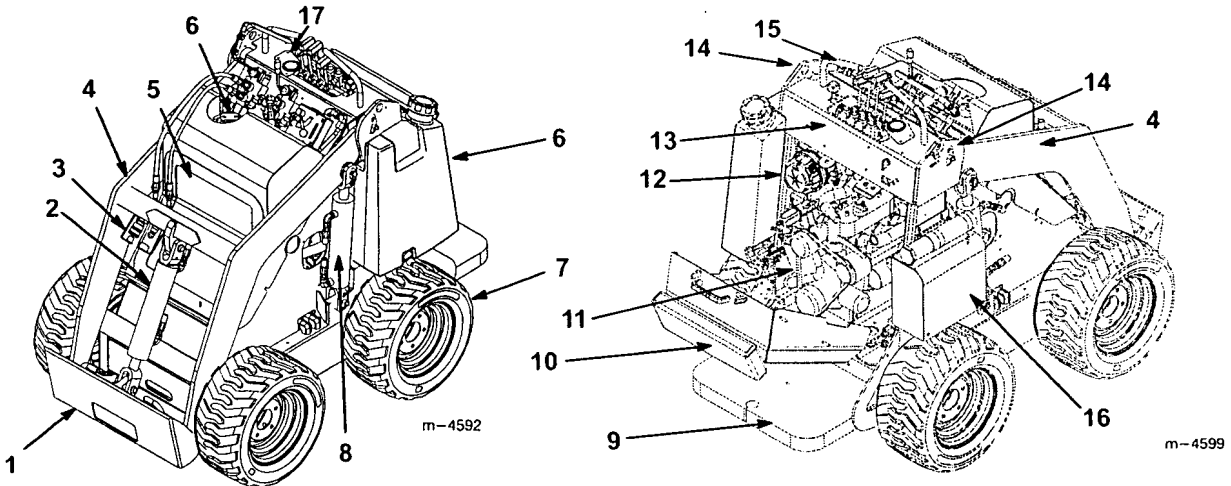


Figure 11

- | | | | |
|---------------------------------|----------------------|------------------------------|----------------------|
| 1. Mount plate | 6. Fuel tank | 10. Rear access cover (open) | 14. Lift points |
| 2. Tilt cylinder | 7. Wheel | 11. Engine | 15. Handle |
| 3. Auxiliary hydraulic couplers | 8. Lift cylinder | 12. Air filter | 16. Battery |
| 4. Loader arms | 9. Operator platform | 13. Control panel | 17. Indicator lights |
| 5. Front access cover | | | |

CAUTION

POTENTIAL HAZARD

- The operator could fall off of the platform.

WHAT CAN HAPPEN

- The operator could be seriously injured.

HOW TO AVOID THE HAZARD

- Do not move any of the control levers unless standing with both feet on the platform and with hands holding the handles.

Controls

Become familiar with all the controls (Fig. 12) before you start the engine and operate the traction unit.

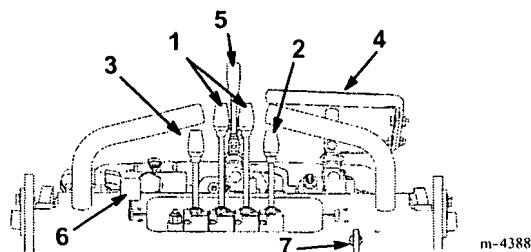


Figure 12

- | | |
|-------------------------------|-------------------------|
| 1. Traction control levers | 5. Speed selector lever |
| 2. Attachment tilt lever | 6. Throttle lever |
| 3. Loader arm lever | 7. Key switch |
| 4. Auxiliary hydraulics lever | |

Key Switch

The key switch, used to start and stop the engine, has three positions: stop, run, and start.

To start the engine, rotate the key to the start position. Release the key when engine starts and it will move automatically to the run position.

To stop the engine, rotate the key to the stop position.

Throttle Lever

Move the control forward to increase the engine speed and rearward to decrease speed.

Traction Control Levers

To move forward, move the traction control levers forward. To move rearward, move the traction control levers rearward.

To go straight, move both traction control levers equally.

To turn, move the lever located on the side you want to turn back toward the neutral position while keeping the other lever engaged.

The farther you move the traction control levers in either direction, the faster the traction unit will move in that direction.

To slow or stop, move the traction control levers to neutral.

Attachment Tilt Lever

To tilt the attachment forward, slowly push the attachment tilt lever forward.

To tilt the attachment rearward, slowly pull the attachment tilt lever rearward.

Loader Arm Lever

To lower the loader arms, slowly push the loader arm lever forward.

To raise the loader arms, slowly pull the loader arm lever rearward.

Auxiliary Hydraulics Lever

To operate a hydraulic attachment in a forward direction, slowly pull the auxiliary hydraulics lever rearward.

To operate a hydraulic attachment in a reverse direction, slowly push the auxiliary hydraulics lever forward.

Speed Selector Lever

Move the speed selector lever to the fast (rabbit) position to set the traction drive, loader arms, and attachment tilt to high speed and the auxiliary hydraulics to low speed.

Move the speed selector lever to the slow (turtle) position to set the auxiliary hydraulics to high speed and the traction drive, loader arms, and attachment tilt to low speed.

WARNING

POTENTIAL HAZARD

- If the speed selector lever is moved while the traction unit is in motion, the traction unit will either stop suddenly or accelerate quickly.
- If the traction unit is operated with the speed selector lever in an intermediate position, the traction unit will operate erratically and may be damaged.

WHAT CAN HAPPEN

- You could be thrown forward or backwards, resulting in injury.
- If the traction unit accelerates quickly, you could lose control of the traction unit and injure bystanders or yourself.
- You could lose control of the traction unit, severely injuring yourself or others.
- The traction unit could be damaged.

HOW TO AVOID THE HAZARD

- Do not move the speed selector lever when the traction unit is in motion.
- Do not operate the traction unit when the speed selector is in any intermediate position (i.e., any position other than fully forward or fully rearward).

Flow Divider Control

The traction unit hydraulics (i.e., the traction drive, loader arms, and attachment tilt) work on a separate hydraulic circuit from the auxiliary hydraulics for powering attachments; however, the two systems share the same hydraulic pumps. Using the flow divider control (Fig. 13), you can vary the speed of the traction unit hydraulics by diverting hydraulic flow to the auxiliary hydraulics circuit. The flow divider allows you to divide the flow of fluid in varying degrees to slow the traction unit. Thus, the

more hydraulic flow you divert to the auxiliary hydraulics, the slower the traction unit hydraulics will move.

Note: The flow divider position (i.e., 9–12 o'clock) is determined when standing in the normal operator's position. Figure 13 shows the flow divider from the front.

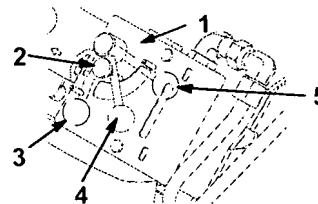


Figure 13

- | | |
|-------------------------|------------------------------|
| 1. Flow divider control | 4. 10 to 11 o'clock position |
| 2. Knob | 5. 9 o'clock position |
| 3. 12 o'clock position | |

- Move the flow divider control to the twelve-o'clock position to provide maximum speed to the traction unit hydraulics.

Use this setting for fast operation of the traction unit.

- Move the flow divider control between the twelve-o'clock and nine-o'clock positions to slow the traction unit hydraulics and fine tune the speed.

Use a setting in this range with attachments with hydraulics where you need to both run the attachment and move the traction unit hydraulics, such as the auger, boring unit, hydraulic blade, and tiller.

- Move the control to the nine-o'clock position to transfer all hydraulic flow to the auxiliary hydraulics of the attachment.

In this setting, the traction unit hydraulics will not work. Use this setting with hydraulic attachments that do not require the traction unit hydraulics. There are currently no attachments that require the nine-o'clock position; however,

the trencher does work best if you set it close to nine-o'clock so that the traction unit will creep slowly when trenching.

Note: The flow divider control can be fixed in place by turning the knob on the control clockwise until it contacts the dial (Fig. 13).

Indicator Lights

The indicator lights warn you in the case of a system malfunction and, in the case of the glow plug light, indicate that the glow plugs are on. Figure 14 illustrates the four indicator lights.

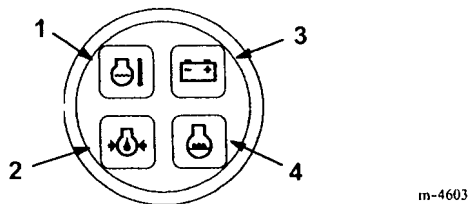


Figure 14

- | | |
|-----------------------------|--------------------|
| 1. Engine temperature light | 3. Battery light |
| 2. Oil pressure light | 4. Glow plug light |

Engine Temperature Light

If the engine temperature light is on, the engine is overheating. Stop the engine and allow the traction unit to cool down. Check the coolant level and the belts to the fan and water pump. Fill the coolant as required and replace any worn or slipping belts. If the problem persists, contact your Authorized Toro Dealer for diagnostics and repair.

Oil Pressure Light

This light is on for a few seconds whenever you start the engine. If the oil pressure light is on while the engine is running, the engine oil pressure is low. Stop the engine and allow the traction unit to cool

down. Check the oil level and fill the crankcase with oil as needed. If the problem persists, contact your Authorized Toro Dealer for diagnostics and repair.

Battery Light

This light is on for a few seconds whenever you start the engine. If the battery light is on while the engine is running, the alternator, battery, or electrical system is broken. Contact your Authorized Toro Dealer for diagnostics and repair.

Glow Plug Light

This light is on when the key is turned to run before starting the engine. The glow plug light will remain on for up to 10 seconds, indicating that the glow plugs are warming the engine. If the glow plug light is on while the engine is running, the glow plugs are broken. Contact your Authorized Toro Dealer for diagnostics and repair.

Starting and Stopping the Engine

Starting the Engine

1. Stand on the platform.
2. Move the auxiliary hydraulics valve lever to neutral.
3. Move the throttle lever midway between slow (turtle) and fast (rabbit) positions.
4. Insert the key into the ignition and turn it to the run position.

Note: The battery, oil pressure, and glow plug lights will come on.

5. When the glow plug light turns off, turn the key to the start position. When the engine starts, release the key.

Note: A warm or hot engine may be started without waiting for the light to turn off.

IMPORTANT: Do not engage the starter for more than 10 seconds at a time. If the engine fails to start, allow a 30 second cool-down period between attempts. Failure to follow these instructions can burn out the starter motor.

6. Move the throttle lever to the desired setting.

IMPORTANT: If the engine is run at high speeds when the hydraulic system is cold (i.e., when the ambient air temperature is around freezing or lower), hydraulic system damage could occur. When starting the engine in cold conditions, allow the engine to run in the middle throttle position for 2 to 5 minutes before moving the throttle to fast (rabbit).

Stopping the Engine

1. Move the throttle lever to the slow (turtle) position.
2. Lower the loader arms to the ground.
3. Turn the ignition key to the stop position.

Note: If the engine has been working hard or is hot, let it idle for a minute before stopping it. This helps to cool the engine. In an emergency, the engine may be stopped immediately.

Driving Forward or Backward

The throttle control regulates the engine speed as measured in rpm (revolutions per minute). Place the throttle lever in the fast (rabbit) position for best performance.

Note: You can use a slower throttle position to operate the traction unit at slower speeds.

To drive the traction unit, complete the following actions as necessary:

- To move forward, move the traction control levers forward.
- To move rearward, move the traction control levers rearward.
- To go straight, move both traction control levers equally.
- To turn, move the lever located on the side you want to turn toward the neutral position while keeping the other lever engaged.
- To slow or stop, move the traction control levers to neutral.

Note: The farther you move the traction control levers in either direction, the faster the traction unit will move in that direction.

Stopping the Traction Unit

To stop the traction unit, move the traction control levers to neutral and the throttle lever to slow (turtle), lower loader arms to the ground, and stop the engine. Remove the key.

CAUTION

POTENTIAL HAZARD

- Someone could move or attempt to operate the traction unit while it is unattended.

WHAT CAN HAPPEN

- Children or bystanders may be injured if they use the traction unit.

HOW TO AVOID THE HAZARD

- Always remove the ignition key when leaving the traction unit, even if just for a few seconds.

Moving a Non-functioning Traction Unit

IMPORTANT: Never tow or pull the traction unit. Rotating the wheels manually will cause damage to the hydraulic wheel motors.

1. Stop the engine.
2. Lift the traction unit off the ground, using the two lift points (Fig. 15), and move it onto a trailer.

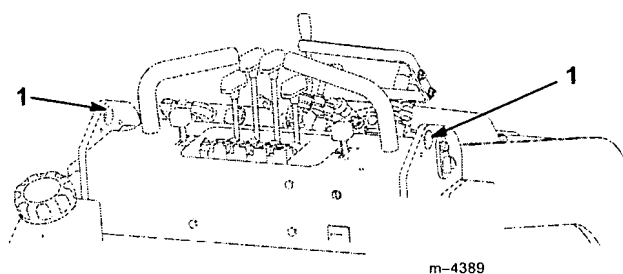


Figure 15

1. Lift points

Using the Cylinder Locks

WARNING

POTENTIAL HAZARD

- The loader arms may lower when in the raised position.

WHAT CAN HAPPEN

- Anyone under the loader arms may be injured or crushed.

HOW TO AVOID THE HAZARD

- Always install the cylinder locks when doing maintenance that requires raised loader arms.

Installing the Cylinder Locks

1. Start the engine.

2. Raise the loader arms to the fully raised position.
3. Stop the engine.
4. Position a loader arm cylinder lock over each lift cylinder rod (Fig. 16).
5. Secure each loader arm cylinder lock with a clevis pin and cotter pin (Fig. 16).

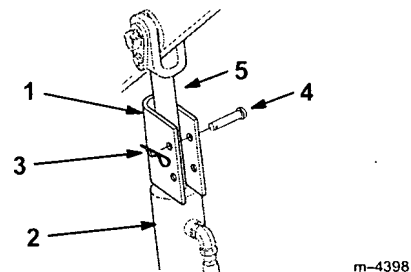


Figure 16

- | | |
|-------------------|----------------------|
| 1. Cylinder lock | 4. Clevis pin |
| 2. Lift cylinder | 5. Lift cylinder rod |
| 3. Hairpin cotter | |

6. Start the engine.
7. Slowly lower the loader arms until cylinder locks contact the cylinder body and rod end.
8. Stop the engine.

Removing/Storing the Cylinder Locks

1. Start the engine.
2. Raise the loader arms to the fully raised position.
3. Stop the engine.
4. Remove the clevis pin and cotter pin securing each cylinder lock.
5. Remove the cylinder locks.
6. Lower the loader arms.
7. Install the cylinder locks over the hydraulic hoses and secure them with the clevis pins and cotter pins (Fig. 17).

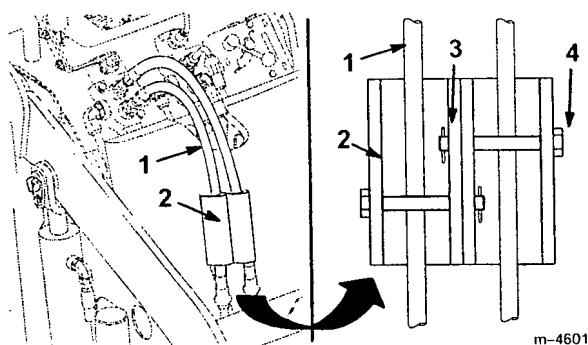


Figure 17

- | | |
|--------------------|-------------------|
| 1. Hydraulic hoses | 3. Hairpin cotter |
| 2. Cylinder locks | 4. Clevis pin |

Installing and Removing Attachments

Connecting an Attachment

IMPORTANT: Use only Toro approved attachments. Attachments can change the stability and the operating characteristics of the traction unit. The warranty of the traction unit may be voided if used with unapproved attachments.

IMPORTANT: Before installing the attachment, ensure that the mount plates are free of any dirt or debris.

1. Position the attachment on a level surface with enough space behind it to accommodate the traction unit.
2. Move the speed selector lever to the turtle position.
3. Start the engine.
4. Slowly push the attachment tilt lever forward to tilt the attachment mount plate forward.
5. Position mount plate into the upper lip of the attachment receiver plate (Fig. 18).

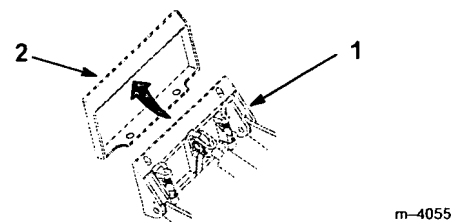


Figure 18

- | | |
|----------------|-------------------|
| 1. Mount plate | 2. Receiver plate |
|----------------|-------------------|

6. Raise the loader arms while tilting back the mount plate at the same time.

IMPORTANT: The attachment should be raised enough to clear the ground, and the mount plate should be tilted all the way back.

7. Stop the engine.
8. Engage the quick attach pins (Fig. 19).
9. Ensure that the cam collars are seated on top of the cast pin brackets (Fig. 19).

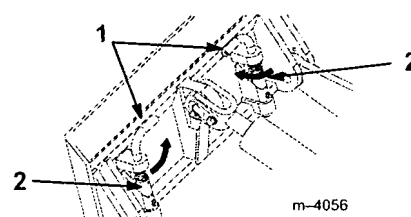


Figure 19

- | |
|--|
| 1. Quick attach pins (shown in engaged position) |
| 2. Cam collars |

Connecting the Hydraulic Hoses

If the attachment requires hydraulics for operation, connect the hydraulic hoses as follows:

1. Stop the engine.
2. Move the auxiliary hydraulics lever forward, backward, and back to neutral to relieve pressure at the hydraulic couplers.

IMPORTANT: Ensure that all foreign matter is cleaned from the hydraulic connections before making connections.

3. Remove the protective covers from the hydraulic couplers on the traction unit. Connect the covers together to prevent contamination during operation.
4. Slide the collars back on the hydraulic couplers and connect the attachment couplers to the traction unit couplers.



WARNING

POTENTIAL HAZARD

- Hydraulic fluid escaping under pressure can penetrate skin and cause injury.

WHAT CAN HAPPEN

- Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

HOW TO AVOID THE HAZARD

- Keep body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.
- Use cardboard or paper to find hydraulic leaks, never use your hands.

5. Confirm that the connection is secure by pulling on the hoses.

Removing an Attachment

1. Lower the attachment to the ground
2. Stop the engine.
3. Disengage the quick attach pins by turning them to the outside.
4. If the attachment uses hydraulics, move the auxiliary hydraulics lever forward, backward, and back to neutral to relieve pressure at the hydraulic couplers.

5. If the attachment uses hydraulics, slide the collar back on the hydraulic couplers and disconnect them.

IMPORTANT: Connect the attachment hoses together to prevent hydraulic system contamination during storage.

6. Install the protective covers onto the hydraulic couplers on the traction unit.
7. Start the engine, tilt the mount plate forward, and back the traction unit away from the attachment.

Securing the Traction Unit for Transport

When transporting the traction unit on a trailer, always use the following procedure:

IMPORTANT: Do not operate or drive the traction unit on roadways.

1. Lower the loader arms.
2. Stop the engine.
3. Secure the traction unit to the trailer with chains or straps using the operator platform support openings to secure the rear of the traction unit and the loader arms/mount plate to secure the front of the traction unit.

Maintenance

Service Interval Chart

Service Operation	Each Use	8 Hours	25 Hours	75 Hours	100 Hours	200 Hours	400 Hours	Yearly
Hydraulic Fluid—check level	Initial		X					
Hydraulic Fluid—change							X	
Hydraulic Filter—change		Initial				X		
Engine Oil—check level	X							
Engine Oil—change ¹				X (Initial at 50)				
Engine Oil Filter—change (150 hours or every other oil change) ¹					150 hrs			
Wheel Nuts—tighten		Initial						
Chassis—grease ²		X						
Primary Air Filter—clean ¹ or replace						X		
Safety Air Filter—replace ¹								600 hrs
Engine RPM (idle & full throttle)—check							X	
Fuel—drain ³								X
Hydraulic lines—check					X			
Battery—check electrolyte					X			
Battery—charge, disconnect cables ³	Initial							X
Fuel Filter—replace						X		
Fan and Water Pump Belt—check ⁶					X			
Radiator Coolant Level—check	X							
Radiator—flush & change coolant ⁶								X
Tires—check pressure	X							
Fasteners—check/tighten	X							
Chipped Surfaces—paint ³								X
¹ More often in dusty, dirty conditions, ² Immediately <u>after</u> every washing, ³ Storage Service, ⁴ Immediately if water is present, ⁵ Replace moving lines every 2 years or 1500 operating hours, ⁶ Refer to your engine Operator's Manual or contact your Authorized Toro Dealer for service.								

CAUTION

POTENTIAL HAZARD

- If you leave the key in the ignition switch, someone could start the engine.

WHAT CAN HAPPEN

- Accidental starting of the engine could seriously injure you or other bystanders.

HOW TO AVOID THE HAZARD

- Remove the key from the ignition switch and disconnect negative battery cable from battery before you do any maintenance.

Opening the Access Covers

Removing the Front Access Cover

1. Raise the loader arms and install the cylinder locks; refer to Using the Cylinder Locks, page 22.

Note: In the case that you need to remove the front access cover without raising the loader arms, be very careful not to damage the cover or hydraulic hoses as you maneuver the cover out from under the arms.

2. Stop the engine and remove the key.
3. Release the four locking tabs (Fig. 20).
4. Pull the cover off of the traction unit (Fig. 20).

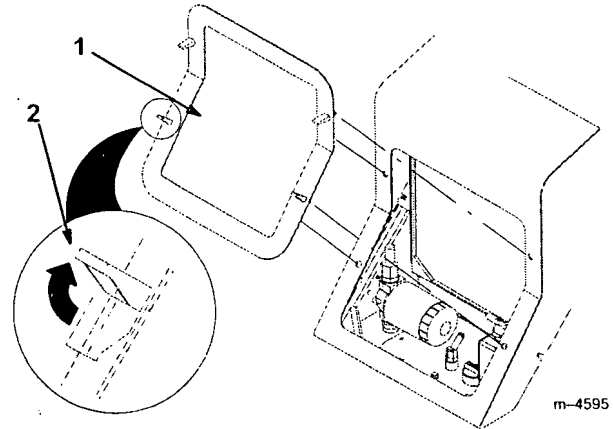
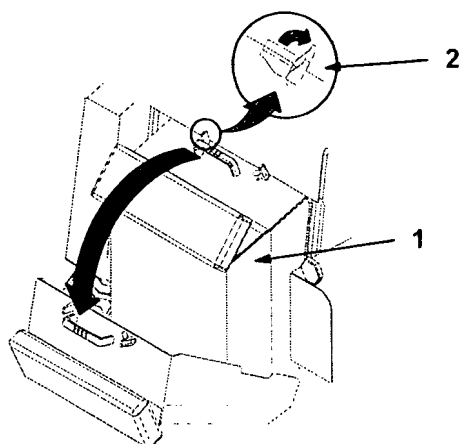


Figure 20

1. Front access cover
 2. Locking tabs
5. When finished, replace the front access cover and secure it with the four locking tabs.

Opening the Rear Access Cover

1. Stop the engine and remove the key.
2. Release the two locking tabs on top of the rear access cover (Fig. 21).
3. Grasping the handle, pull the cover up and back to swing it open (Fig. 21).



m-4597

Figure 21

1. Rear access cover 2. Locking tabs

4. When finished, close the rear access cover by swinging it up and seating it in place. Secure it with the two locking tabs.

Servicing the Air Cleaner

Primary Filter: Clean or replace every 200 operating hours.

Safety Filter: Replace after every 600 operating hours.

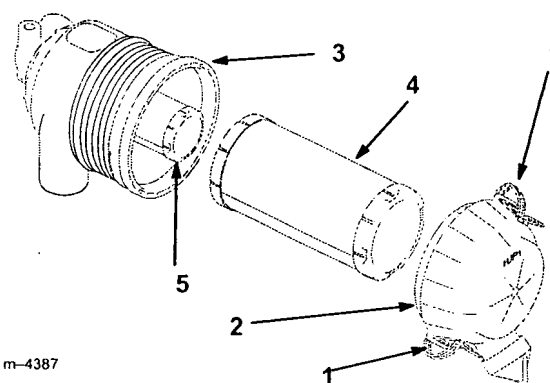
Note: Service the air cleaner more frequently if operating conditions are extremely dusty or sandy.

Removing the Filter

1. Lower the loader arms and stop the engine. Remove the key.
2. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
3. Release the latches on the air cleaner and pull the air cleaner cover off of the air cleaner body (Fig. 22).
4. Clean the inside of the air cleaner cover with compressed air.

5. Gently slide the primary filter out of the air cleaner body (Fig. 22). Avoid knocking the filter into the side of the body. Do not remove the safety filter, unless you intend to replace it as well.
6. Inspect the primary filter for damage by looking into the filter while shining a bright light on the outside of the filter. Holes in the filter will appear as bright spots. If the filter is damaged, discard it; otherwise, clean it.

IMPORTANT: Never attempt to clean the safety filter. If the safety filter is dirty, then the primary filter is damaged and you should replace both filters.



m-4387

Figure 22

1. Latches 4. Primary filter
2. Air cleaner cover 5. Safety filter
3. Air filter body

Cleaning the Primary Filter

Blow compressed air from the inside to the outside of the primary filter.

IMPORTANT: Do not exceed 100 psi (689.5 kPa) and keep the hose at least 2 inches (5 cm) from the filter.

Installing the Filters

1. If installing new filters, check each filter for shipping damage. Do not use a damaged filter.

2. If the safety filter is being replaced, carefully slide it into the filter body (Fig. 22).
3. Carefully slide the primary filter over the safety filter (Fig. 22). Ensure that it is fully seated by pushing on the outer rim of the filter while installing it.

IMPORTANT: Do not press on the soft inside area of the filter.

4. Install the air cleaner cover with the side indicated as UP facing up and secure the latches (Fig. 22).
5. Close the rear access cover.

Servicing the Engine Oil

Change oil after the first 50 operating hours and then every 75 operating hours thereafter.

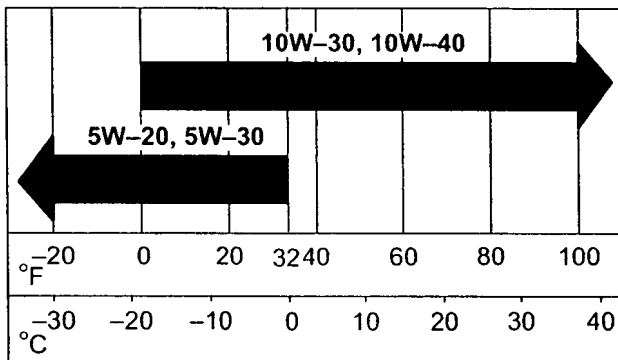
Note: Change oil more frequently when operating conditions are extremely dusty or sandy.

Oil Type: MIL-L-2104C (API service CD or higher)

Crankcase Capacity: w/filter, 0.84 gal. (3.2 l)

Viscosity: See table below

USE THESE SAE VISCOSITY OILS



Changing the Oil

1. Start the engine and let it run for five minutes. This warms the oil so it drains better.
2. Park the traction unit so that the drain side is slightly lower than the opposite side to ensure that the oil drains completely.
3. Lower the loader arms, chock the wheels, and stop the engine. Remove the key.

CAUTION

POTENTIAL HAZARD

- Components will be hot if the traction unit has been running.

WHAT CAN HAPPEN

- Touching hot components can cause burns.

HOW TO AVOID THE HAZARD

- Allow the traction unit to cool before performing maintenance or touching any components.

4. Place a pan under the oil drain tube (Fig. 23).
5. Loosen the clamp and remove the plug (Fig. 23).
6. When the oil has drained completely, replace the plug and tighten the clamp.

Note: Dispose of the used oil at a certified recycling center.

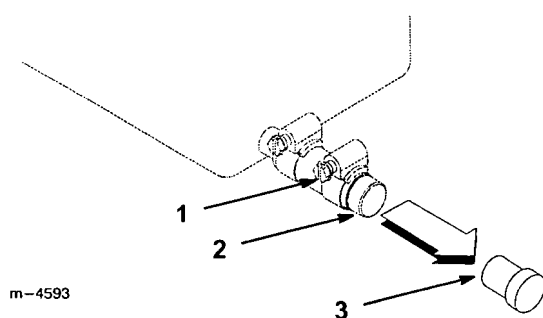


Figure 23

1. Clamp
2. Oil drain tube

3. Plug

7. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
8. Remove the oil fill cap and slowly pour approximately 80% of the specified amount of oil in through the valve cover.
9. Check the oil level; refer to Checking the Oil Level, page 13.
10. Slowly add additional oil to bring the level to the F (full) mark on the dipstick.
11. Replace the fill cap.
12. Close the rear access cover.

Changing the Oil Filter

Replace the oil filter every 150 hours or every other oil change.

Note: Change the oil filter more frequently when operating conditions are extremely hot, dusty, or sandy.

1. Drain the oil from the engine; refer to Changing the Oil, page 28.
2. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
3. Remove the old filter and wipe the filter adapter (Fig. 24) gasket surface.

4. Allow a minute or two for the oil to be absorbed by filter material, then pour off the excess oil.
5. Apply a thin coat of new oil to the rubber gasket on the replacement filter (Fig. 24).

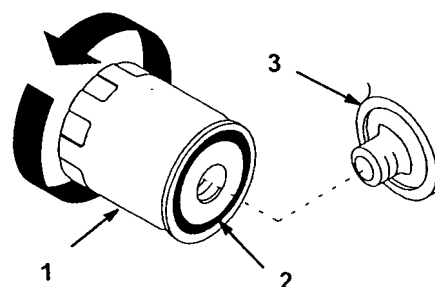


Figure 24

1. Oil filter
2. Gasket
3. Adapter

6. Install the replacement oil filter to the filter adapter. Turn the oil filter clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Fig. 24).
7. Fill the crankcase with the proper type of new oil; refer to Changing the Oil, page 28.
8. Close the rear access cover.

Greasing the Traction Unit

Grease all pivot joints every 8 operating hours and immediately after every washing.

Grease Type: General-purpose grease.

1. Lower the loader arms and stop the engine. Remove the key.
2. Clean the grease fittings with a rag.
3. Connect a grease gun to each fitting (Fig 25 and 26).

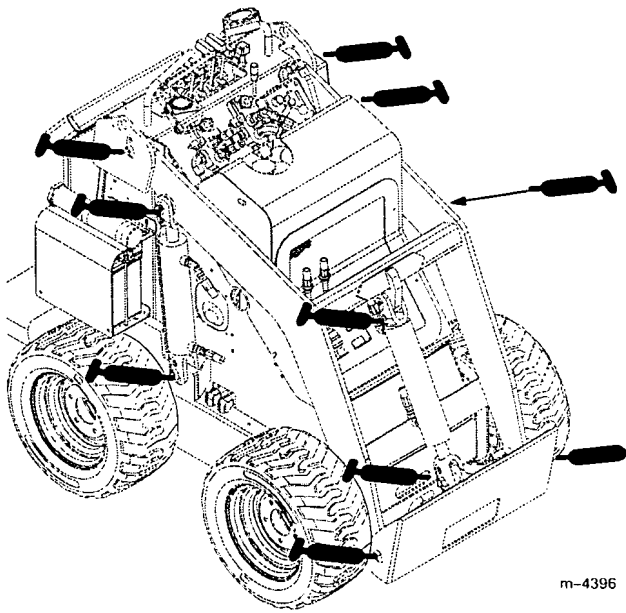


Figure 25

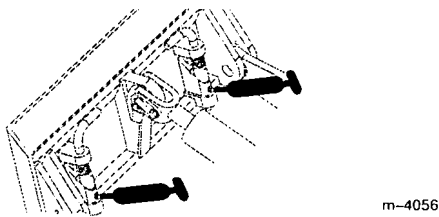


Figure 26

4. Pump grease into the fittings until grease begins to ooze out of the bearings (approximately 3 pumps).
5. Wipe up any excess grease.

Changing the Fuel Filter

Change the fuel filter after every 200 operating hours or yearly, whichever occurs first.

Never re-install a dirty filter.

1. Lower the loader arms and stop the engine. Remove the key.
2. Shut off the fuel valve on the bottom of the fuel tank (Fig. 29).
3. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
4. Open the drain valve (Fig. 27) and drain the fuel from the fuel filter into a suitable container and dispose of it properly.
5. Remove the fuel filter with a filter wrench (Fig. 27).

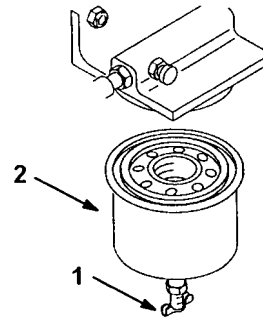


Figure 27

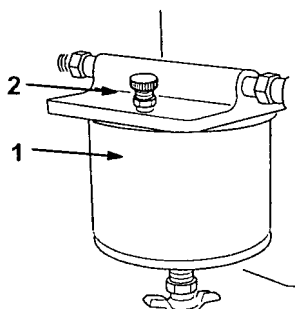
- | | |
|----------------|----------------|
| 1. Drain valve | 2. Fuel filter |
|----------------|----------------|

6. Clean the mounting surface.
7. Lubricate the gasket on the new filter with clean engine oil. Screw on the new filter by hand until the gasket contacts the housing. Then tighten it another 1/2 turn.
8. Open the fuel valve on the bottom of the fuel tank (Fig. 29).
9. Bleed the fuel system; refer to Bleeding the Fuel System, page 31.
10. Close the rear access cover.
11. Start the engine and check for leaks.

Bleeding the Fuel System

Bleeding the air from the fuel system in any of the following situations:

- Initial start up of a new traction unit or a traction unit that has been stored.
 - After the engine has ceased running due to lack of fuel.
 - After maintenance has been performed on the fuel system components.
1. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
 2. Open the bleed screw on top of the fuel filter to fill the bowl with fuel (Fig. 28).



m-3708

Figure 28

1. Fuel filter 2. Bleed screw

3. Use the ignition to crank the engine until fuel comes out of the bleed screw in a steady stream.
4. Close the bleed screw.
5. On left side of the engine, locate the air vent plug on top of the fuel injection pump and open it.
6. Use the ignition to crank the engine until fuel comes out of the vent plug in a steady stream.
7. Close the vent plug.
8. Close the rear access cover.

Draining the Fuel Tank



POTENTIAL HAZARD

- In certain conditions fuel is extremely flammable and highly explosive.

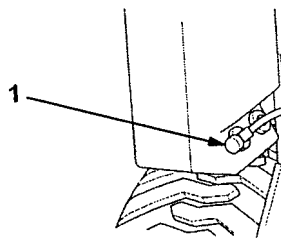
WHAT CAN HAPPEN

- A fire or explosion from fuel can burn you, others, and cause property damage.

HOW TO AVOID THE HAZARD

- Drain fuel from the fuel tanks when the engine is cold. Do this outdoors in an open area. Wipe up any fuel that spills.
- Never drain fuel near an open flame or where fumes may be ignited by a spark.
- Never smoke while handling fuel.

1. Park the traction unit on a level surface, to ensure that the fuel tanks drain completely.
2. Lower the loader arms and stop the engine. Remove the key.
3. Shut off the fuel valve on the bottom of the fuel tank (Fig. 29).



m-4390

Figure 29

1. Fuel valve

4. Open the rear access cover; refer to Opening the Rear Access Cover, page 26.
5. Loosen the hose clamp at the fuel filter and slide it up the fuel line away from the filter.
6. Pull the fuel line off of the fuel filter, open the fuel valves, and allow the fuel to drain into a fuel can or drain pan.

Note: Now is the best time to install a new fuel filter because the fuel tank is empty.

7. Install the fuel line onto the fuel filter.
8. Slide the hose clamp close to the fuel filter to secure the fuel line.
9. Close the rear access cover.
10. Open the fuel valve on the bottom of the fuel tank.
8. Install the replacement hydraulic filter onto the filter adapter. Tighten it clockwise until the rubber gasket contacts the filter adapter, then tighten the filter an additional 1/2 turn (Fig. 30).
9. Clean up any spilled fluid.
10. Start the engine and let it run for about two minutes to purge air from the system.
11. Stop the engine and check for leaks.
12. Check the fluid level in the hydraulic tank (refer to Checking the Hydraulic Fluid, page 15) and add fluid to raise the level to the mark on the dipstick. Do not over fill the tank.

Servicing the Hydraulic System

Replacing the Hydraulic Filter

Change the hydraulic filter:

- After the first 8 operating hours.
 - After every 200 operating hours.
1. Position traction unit on a level surface.
 2. Raise the loader arms and install the cylinder locks; refer to Using the Cylinder Locks, page 22.
 3. Stop the engine and remove the key.
 4. Remove the front access cover, refer to Removing the Front Access Cover, page 26.
- IMPORTANT: Do not substitute an automotive oil filter or severe hydraulic system damage may result.**
5. Place a drain pan under the filter.
 6. Remove the old filter and wipe the filter adapter, gasket surface clean.
 7. Apply a thin coat hydraulic fluid to the rubber gasket on the replacement filter (Fig. 30).

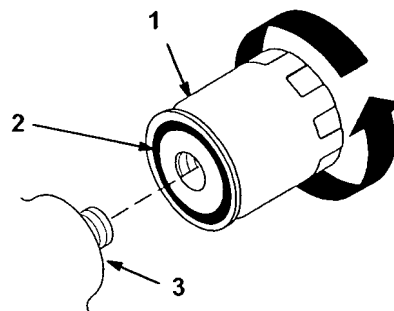


Figure 30

- | | |
|---------------------|------------|
| 1. Hydraulic filter | 3. Adapter |
| 2. Gasket | |

13. Install the front access cover.
14. Remove and store the cylinder locks (refer to Using the Cylinder Locks, page 22) and lower the loader arms.

Changing the Hydraulic Fluid

Change the hydraulic fluid after every 400 operating hours.

1. Position traction unit on a level surface.
2. Raise the loader arms and install the cylinder locks; refer to Using the Cylinder Locks, page 22.
3. Stop the engine and remove the key.

4. Remove the front access cover, refer to Removing the front access cover, page 26.

IMPORTANT: Do not substitute automotive oil or severe hydraulic system damage may result.

5. Place a large drain pan under the traction unit that can hold at least 17 gal. (67 l).
6. Remove the drain plug from the bottom of the hydraulic tank and allow the fluid to completely drain out.
7. Install the drain plug.
8. Fill the hydraulic tank with Toro Hy-Pro, Mobil Fluid 424, or equivalent; refer to Checking the Hydraulic Fluid, page 15.

Note: Dispose of used oil at a certified recycling center.

9. Install the front access cover
10. Remove and store the cylinder locks (refer to Using the Cylinder Locks, page 22) and lower the loader arms.

Checking Hydraulic Lines

After every 100 operating hours, check the hydraulic lines and hoses for leaks, loose fittings, kinked lines, loose mounting supports, wear, weather, and chemical deterioration. Replace all moving hydraulic hoses every 1500 hours or 2 years, whichever comes first. Make necessary repairs before operating.



WARNING

POTENTIAL HAZARD

- Hydraulic fluid escaping under pressure can penetrate skin and cause injury.

WHAT CAN HAPPEN

- Fluid accidentally injected into the skin must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result.

HOW TO AVOID THE HAZARD

- Keep body and hands away from pin hole leaks or nozzles that eject high pressure hydraulic fluid.
- Use cardboard or paper to find hydraulic leaks, never use your hands.

Servicing the Battery

Check the electrolyte level in the battery every 100 hours. Always keep the battery clean and fully charged. Use a paper towel to clean the battery case. If the battery terminals are corroded, clean them with a solution of four parts water and one part baking soda. Apply a light coating of grease to the battery terminals to reduce corrosion.

Voltage: 12 v, 435 Cold Cranking Amps

Checking the Electrolyte Level

1. Remove the battery cover (Fig. 3).
2. Open covers to see into the cells. The electrolyte must be up to the lower part of the tube (Fig. 31).

IMPORTANT: Do not allow the electrolyte to get below the plates. (Fig. 31).

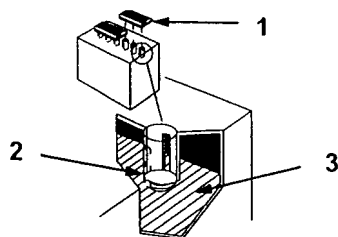


Figure 31

1262

1. Filler caps
2. Lower part of tube
3. Plates

3. If the electrolyte is low, add the required amount of distilled water; refer to Adding Water to the Battery, below.

Adding Water to the Battery

The best time to add distilled water to the battery is just before you operate the traction unit. This lets the water mix thoroughly with the electrolyte solution.

1. Clean the top of the battery with a paper towel.
2. Lift off the filler caps (Fig. 31).
3. Slowly pour distilled water into each battery cell until the level is up to the lower part of the tube (Fig. 31).

IMPORTANT: Do not overfill the battery because electrolyte (sulfuric acid) can cause severe corrosion and damage to the chassis.

4. Press the filler caps onto the battery.

Charging the Battery

IMPORTANT: Always keep the battery fully charged (1.260 specific gravity). This is especially important to prevent battery damage when the temperature is below 32°F (0°C).

1. Check the electrolyte level; refer to Checking Electrolyte Level, page 33.

2. Remove the filler caps from the battery and connect a 3 to 4 amp battery charger to the battery posts. Charge the battery at a rate of 4 amperes or less for 4 hours (12 volts). Do not overcharge the battery.

WARNING

POTENTIAL HAZARD

- Charging the battery produces gasses.

WHAT CAN HAPPEN

- Battery gasses can explode.

HOW TO AVOID THE HAZARD

- Keep cigarettes, sparks, and flames away from the battery.

3. Install the filler caps after the battery is fully charged.
4. Replace the battery cover.

Cleaning and Storage

1. Lower the loader arms and stop the engine. Remove the key.
2. Remove dirt and grime from the external parts of the entire traction unit, especially the engine. Clean dirt and chaff from the outside of the engine.

IMPORTANT: You can wash the traction unit with mild detergent and water. Do not pressure wash the traction unit. Avoid excessive use of water, especially near the control panel, engine, hydraulic pumps, and motors.

3. Service the air cleaner; refer to Servicing the Air Cleaner, page 27.
4. Grease the traction unit; refer to Greasing the Traction Unit, page 29.
5. Change the crankcase oil; refer to Servicing the Engine Oil, page 28.

6. Check the tire pressure; refer to Tire Pressure, page 15.
7. Charge the battery; refer to Servicing the Battery, page 33.
8. Flush the fuel tank with fresh, clean diesel fuel
9. Check and tighten all bolts, nuts, and screws. Repair or replace any part that is damaged.
10. Paint all scratched or bare metal surfaces. Paint is available from your Authorized Service Dealer.
11. Check anti-freeze protection and fill the radiator with a 50/50 solution of water and permanent ethylene glycol anti-freeze.
12. Store the traction unit in a clean, dry garage or storage area. Remove the key from the ignition switch and keep it in a memorable place.
13. Cover the traction unit to protect it and keep it clean.

Troubleshooting

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The starter does not crank.	<ol style="list-style-type: none"> 1. The electrical connections are corroded or loose. 2. A fuse is blown or loose. 3. The relay or switch is damaged. 4. The battery is discharged. 5. A damaged starter or starter solenoid. 6. Seized internal engine components. 	<ol style="list-style-type: none"> 1. Check the electrical connections for good contact. 2. Correct or replace the fuse. 3. Contact your Authorized Service Dealer. 4. Charge the battery or replace it. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer.
The engine cranks, but will not start.	<ol style="list-style-type: none"> 1. Incorrect starting procedure. 2. The fuel tank is empty. 3. The fuel shut-off valve is closed. 4. Dirt, water, stale fuel, or incorrect fuel is in the fuel system. 5. Clogged fuel line. 6. There is air in the fuel 7. Inoperative glow plugs. 	<ol style="list-style-type: none"> 1. Refer to Starting and Stopping the Engine, page 20. 2. Fill with fresh fuel. 3. Open the fuel shut-off valve. 4. Drain and flush the fuel system; add fresh fuel. 5. Clean or replace. 6. Bleed the nozzles and check for air leaks at the fuel hose connections and fittings between the fuel tank and engine. 7. Check the fuse, glow plugs and wiring.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The engine cranks, but will not start (continued).	8. Slow cranking speed.	8. Check the battery, oil viscosity and starting motor (contact your Authorized Service Dealer).
	9. The air cleaner element is dirty.	9. Clean or replace.
	10. Low compression.	10. Contact your Authorized Service Dealer.
	11. The injection nozzles are damaged.	11. Contact your Authorized Service Dealer.
	12. The fuel filter is clogged.	12. Replace the fuel filter.
	13. The injections pump timing is incorrect.	13. Contact your Authorized Service Dealer.
	14. The injection pump is broken.	14. Contact your Authorized Service Dealer.
The engine starts, but does not keep running.	15. Improper fuel grade for cold weather use.	15. Drain the fuel system and replace the fuel filter. Add fresh fuel of proper grade for ambient temperature conditions. You may need to warm the entire traction unit.
	16. The ETR solenoid is broken.	16. Contact your Authorized Service Dealer.
	1. The fuel tank vent is restricted.	1. Loosen the cap. If the engine runs with the cap loosened, replace the cap.
	2. Dirt or water is in the fuel system.	2. Drain and flush the fuel system; add fresh fuel.
	3. The fuel filter is clogged.	3. Replace the fuel filter.
	4. The fuel pump is damaged.	4. Contact your Authorized Service Dealer.
	5. There is air in the fuel.	5. Bleed the nozzles and check for air leaks at fuel hose connections and fittings between the fuel tank and engine.
	6. Improper fuel grade for cold weather use.	6. Drain the fuel system and replace the fuel filter. Add fresh fuel of proper grade for ambient temperature conditions.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The engine runs, but knocks or misses.	<ol style="list-style-type: none"> 1. Dirt, water, stale fuel, or incorrect fuel is in the fuel system. 2. Engine overheating. 3. There is air in the fuel. 4. The injection nozzles are damaged. 5. Low compression 6. The injection pump timing is incorrect. 7. Excessive carbon build-up. 8. Internal wear or damage. 	<ol style="list-style-type: none"> 1. Drain and flush the fuel system; add fresh fuel. 2. See ENGINE OVERHEATS. 3. Bleed nozzles and check for air leaks at the fuel hose connections and fittings between the fuel tank and engine. 4. Contact your Authorized Service Dealer. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer. 7. Contact your Authorized Service Dealer. 8. Contact your Authorized Service Dealer.
The engine will not idle.	<ol style="list-style-type: none"> 1. The fuel tank vent is restricted. 2. Dirt, water, stale fuel, or incorrect fuel is in the fuel system. 3. The fuel pump is damaged. 4. Low compression. 5. The air cleaner element is dirty. 6. The fuel filter is clogged. 7. There is air in the fuel. 	<ol style="list-style-type: none"> 1. Loosen the cap. If the engine runs with the cap loosened, replace the cap. 2. Drain and flush the fuel system; add fresh fuel. 3. Contact your Authorized Service Dealer. 4. Contact your Authorized Service Dealer. 5. Clean or replace. 6. Replace the fuel filter. 7. Bleed the nozzles and check for air leaks at the fuel hose connections and fittings between the fuel tank and engine.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
The engine overheats.	<ol style="list-style-type: none"> 1. More coolant is needed. 2. Restricted air flow to the radiator. 3. The crankcase oil level is incorrect. 4. Excessive loading. 5. The thermostat is damaged. 6. The fan belt is loose or broken. 7. Incorrect fuel is in the fuel system. 8. Injection timing is incorrect. 9. Coolant pump is damaged. 	<ol style="list-style-type: none"> 1. Check and add coolant. 2. Inspect and clean the radiator screen with every use. 3. Fill or drain to the full mark. 4. Reduce load; use lower ground speed. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer. 7. Drain and flush the fuel system; add fresh fuel. 8. Contact your Authorized Service Dealer. 9. Contact your Authorized Service Dealer.
The engine loses power.	<ol style="list-style-type: none"> 1. The crankcase oil level is incorrect. 2. The air cleaner element is dirty. 3. Dirt, water, stale fuel, or incorrect fuel is in the fuel system. 4. The engine is overheated. 5. Low compression. 6. The fuel tank vent is restricted. 7. The engine load is excessive. 8. There is air in the fuel. 9. The injection pump timing is incorrect. 10. The injection pump is damaged. 	<ol style="list-style-type: none"> 1. Fill or drain to the full mark. 2. Clean or replace. 3. Drain and flush the fuel system; add fresh fuel. 4. See ENGINE OVERHEATS. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer. 7. Reduce ground speed. 8. Bleed the nozzles and check for air leaks at the fuel hose connections and fittings between the fuel tank and engine. 9. Contact your Authorized Service Dealer. 10. Contact your Authorized Service Dealer.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Excessive black smoke from exhaust.	<ol style="list-style-type: none"> 1. The air cleaner element is dirty. 2. The injection pump timing is incorrect. 3. Incorrect fuel is in the fuel system. 4. The injection nozzles are damaged. 5. The injection pump is damaged. 6. Excessive loading. 	<ol style="list-style-type: none"> 1. Clean or replace. 2. Contact your Authorized Service Dealer. 3. Drain the fuel system and refill with specified fuel. 4. Contact your Authorized Service Dealer. 5. Contact your Authorized Service Dealer. 6. Reduce load; use lower ground speed.
Excessive white smoke from exhaust.	<ol style="list-style-type: none"> 1. The key was turned to the start position before the glow plug light turned off. 2. The engine temperature is low. 3. The glow plugs are inoperative. 4. The fuel injection nozzles are damaged. 5. The injection pump timing is incorrect. 6. Low compression. 	<ol style="list-style-type: none"> 1. Turn the key to the run position and allow the glow plug light to turn off before starting the engine. 2. Check the thermostat. 3. Check the fuse, glow plugs and wiring. 4. Contact your Authorized Service Dealer. 5. Contact your Authorized Service Dealer. 6. Contact your Authorized Service Dealer.
Traction unit does not drive.	<ol style="list-style-type: none"> 1. Traction pump drive coupler is loose or broken. 2. Hydro fluid level low. 3. Pump and/or wheel motor is damaged. 4. Control valve is damaged. 5. Relief valve is damaged. 6. Flow divider valve lever is in 9 o'clock position. 	<ol style="list-style-type: none"> 1. Contact Authorized Service Dealer. 2. Add hydro fluid to reservoir. 3. Contact your Authorized Service Dealer. 4. Contact your Authorized Service Dealer. 5. Contact your Authorized Service Dealer. 6. Move lever to 12 o'clock to 10 o'clock position.

The Toro SiteWorkTM Systems Product Line

One Year Limited Warranty

The Toro Company warrants your Toro SiteWorkTM Systems Product ("Product") to be free from defects in materials or workmanship for the period of time listed below. Where a warrantable condition exists, Toro will repair the Product at no cost to you including diagnosis, labor, parts, and transportation. This warranty begins on the date the Product is delivered to the original retail purchaser.

Warranty Duration: One year or 500 operational hours, whichever occurs first.

Owner Responsibilities:

As the Product owner, you are responsible for required maintenance and adjustments stated in your Owner's Manual. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim.

Instructions for Obtaining Warranty Service:

You are responsible for notifying the Toro SiteWork Systems Distributor or Authorized Toro SiteWorkTM Systems Dealer from whom you purchased the Product as soon as you believe a warrantable condition exists.

If you need help locating a Toro SiteWorkTM Systems Distributor or Authorized Dealer, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Toro LCE Division
8111 Lyndale Avenue South
Minneapolis, MN, 55420-1196
Telephone: (612) 888-8801
Facsimile: (612) 887-8258

Maintenance Parts:

Parts scheduled for replacement as required maintenance ("Maintenance Parts"), are warranted for the period of time up to the scheduled replacement time for that part.

Items/Conditions Not Covered:

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. The items / conditions listed below are not covered by this warranty:

- Product failures which result from the use of non-Toro replacement parts, or from installation and use of add-on, modified, or unapproved accessories are not covered.
- Product failures which result from failure to perform required maintenance and/or adjustments are not covered.
- Product failures which result from operating the Product in an abusive, negligent or reckless manner are not covered.

- This warranty does not apply to parts subject to consumption through use unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to, digging teeth, tines, spark plugs, tires, filters, chains, etc.
- This warranty does not apply to failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.
- This warranty does not apply to normal "wear and tear" items. Normal "Wear and Tear" includes, but is not limited to, worn painted surfaces, scratched decals or windows, etc.

Other Legal Disclaimers:

The above remedy of product defects through repair by an authorized distributor or dealer is the purchaser's sole remedy for any defect. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Except for the Emissions warranty referenced below, if applicable, there is no other express warranty. All implied warranties of merchantability and fitness for use are limited to the duration of the express warranty.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

The Toro Company is not liable for indirect, incidental or consequential damages in connection with the use of the Product, including any cost or expense of providing substitute Product or service during periods of malfunction or non-use.

Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you.

Note to California residents: The Emissions Control System on your Product may be covered by a separate warranty meeting requirements established by the U.S. Environmental Protection Agency (EPA), or the California Air Resources Board (CARB). The hour limitations set forth above do not apply to the Emissions Control System Warranty. Refer to the California Emission Control Warranty Statement printed in your Owner's Manual or contained in the engine manufacturer's documentation for details.

RAMROD TASKMASTER



SERIES



OPERATOR'S MANUAL

900T

MINI-SKID®

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Airport Industrial Park
Minot, North Dakota
58703

Ph: (800) 667-1581

www.ramrodequip.com

T039368

INTRODUCTION

TO OUR CUSTOMER:

RAMROD EQUIPMENT is pleased that you have chosen a **RAMROD MINI SKID**. This loader is a simple, compact power source designed and manufactured to give you years of dependable service.

Read this Manual carefully before operating the Mini-Skid. It contains the necessary information for safe and proper operating, routine servicing and preventive maintenance.

We also recommend that you carefully read the Engine Manufacturer's Manual before operating the Mini-Skid. Do not neglect the maintenance that is recommended.

The reference to right-hand and left-hand used throughout this Manual refers to the position when operating the machine, facing forward.

For any additional information required, please refer to your **RAMROD Dealer**.

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May 2000
Printed in Canada



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www.ramrodequip.com

T039369



RAMROD EQUIPMENT

NEW MINI-SKID WARRANTY REGISTRATION FORM

Mini-Skid Serial Number	Model Number	Engine Serial Number
Name of Owner	Name of Dealer	
Owner's Address	Dealer's Address	
Date Mini-Skid Sold	Date Mini-Skid Delivered	
OPTIONS & ACCESSORIES		SERIAL NUMBER (IF APPLICABLE)

TIRES:

- ☐ 4.00 X 8
- ☐ 16 X 6.50
- ☐ 18 X 8.50

BUCKETS:

- ☐ 31 inch (787 mm)
- ☐ 36 inch (914 mm)
- ☐ 42 inch (1067 mm)

RAMROD COPY

Please forward to:
RAMROD EQUIPMENT
P.O. BOX 5002, 135 YORK ROAD EAST,
YORKTON, SASKATCHEWAN, CANADA S3N 3Z4
PHONE (306) 786-2600
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FAX (306) 782-1884



RAMROD EQUIPMENT

NEW MINI-SKID WARRANTY REGISTRATION FORM

Mini-Skid Serial Number

Model Number

Engine Serial Number

Name of Owner

Name of Dealer

Owner's Address

Dealer's Address

Date Mini-Skid Sold

Date Mini-Skid Delivered

OPTIONS & ACCESSORIES

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- ☐ 36 inch (914 mm)
- ☐ 42 inch (1067 mm)

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MAY 2000

RAMROD TASKMASTER

135 YORK ROAD EAST,
YORKTON, SASKATCHEWAN, CANADA S3N 3Z4
PHONE (306) 786-2600
FAX (306) 782-1884



RAMROD EQUIPMENT

NEW MINI-SKID WARRANTY REGISTRATION FORM

Mini-Skid Serial Number

Model Number

Engine Serial Number

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Name of Dealer

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CUSTOMER COPY

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MAY 2000

RAMROD TASKMASTER

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I. SAFETY

OPERATE MINI-SKID SAFELY

IMPROPER OPERATION OF THIS MINI-SKID MAY RESULT IN SERIOUS INJURY. BEFORE OPERATING THIS MINI-SKID, OPERATORS MUST HAVE PROPER INSTRUCTIONS, BE FAMILIAR WITH THE SAFETY PRECAUTIONS, AND HAVE READ THIS AND THE ENGINE MANUFACTURER'S MANUAL THOROUGHLY.

THIS SAFETY ALERT SYMBOL
POINTS OUT IMPORTANT
SAFETY PRECAUTIONS.

OPERATORS MUST UNDERSTAND CAPABILITIES AND LIMITATIONS OF THE EQUIPMENT, WITH RESPECT TO SPEED, BRAKING, STEERING, STABILITY AND LOAD CHARACTERISTICS BEFORE STARTING TO OPERATE.

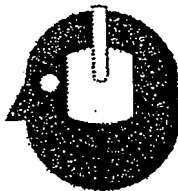
NEW OPERATORS MUST CHECK ALL CONTROLS IN A SAFE, OPEN AREA BEFORE STARTING WORK.

WARNING

*This Decal Advises Of Actions Or Danger
Which Can Cause Personal Injury.*

IMPORTANT

*This Decal Identifies Procedures Which
Must Be Followed To Prevent Damage To
The Mini-Skid.*



*Wear Ear Protection
When Engine is Running.
The Sound Pressure
Level Is: 102 DB for A
weighted level & 88 DB for
C weighted level..*



*Do Not Use The Mini-
Skid During a
Thunderstorm Or When
There Is A Chance Of A
Lightning Strike.*

SAFETY PRECAUTIONS

READ YOUR OWNER'S MANUAL AND ALL SUPPLEMENTS BEFORE OPERATING YOUR MINI-SKID.

WHEN LEARNING TO OPERATE, PROCEED SLOWLY AND CAREFULLY.

WEAR CLOSE FITTING PROTECTIVE CLOTHING AND SHOES.

DO NOT PLACE FEET UNDER THE PLATFORM.

DO NOT OPERATE ANY OF THE CONTROL LEVERS INCLUDING AUXILIARY POWER TAKE-OFF UNLESS YOU ARE STANDING WITH BOTH FEET ON THE PLATFORM AND FIRMLY HOLDING THE GRIP HANDLES.

DO NOT JERK THE CONTROL LEVERS, USE A STEADY EVEN MOTION.

SAFETY PRECAUTIONS - CONTINUED

KEEP HANDS, FEET AND CLOTHING AWAY FROM ALL MOVING PARTS AND CYLINDERS.

DO NOT RIDE IN BUCKET.

DO NOT ALLOW MORE THAN ONE PERSON ON THE MINI-SKID AT ANY TIME.

DO NOT ALLOW ANY OTHER PERSON OR ANIMAL CLOSE THE MINI-SKID WHILE IN OPERATION.

WATCH FOR OTHER PEOPLE AND EQUIPMENT.

KEEP THE BUCKET LOW WHEN TRAVELLING, TURNING OR CHANGING SPEED.

TRAVEL SLOWLY OVER ROUGH TERRAIN.

BEWARE OF TRENCHES, HOLES, AND SIDE SLOPES.

DO NOT DRIVE THE MINI-SKID ACROSS STEEP SLOPES.

LOAD, UNLOAD AND TURN AROUND ON FLAT, LEVEL GROUND ONLY.

ENSURE ADEQUATE VENTILATION WHEN USING THE MACHINE IN CONFINED SPACES.

DO NOT CARRY LOAD WITH ARMS IN A RAISED POSITION. ALWAYS CARRY LOADS CLOSE TO THE GROUND. DO NOT STEP OFF PLATFORM WITH THE LOAD RAISED.

TO AVOID FREE-FALL OF LOAD WHEN LOWERING LIFT ARMS, DO NOT PUSH LIFT ARM LEVER FULLY FORWARD.

DO NOT EXCEED RATED LOAD CAPACITY.

ALWAYS LOWER THE BUCKET AND SHUT OFF THE ENGINE BEFORE LEAVING THE MACHINE.

AVOID PARKING ON A SLOPE. IF IT IS NECESSARY, PARK ACROSS THE GRADE, GROUND THE BUCKET AND BLOCK THE WHEELS.

WHEN HOOKING UP ATTACHMENTS TO THE MACHINE, CHECK TO BE SURE LOCK PINS ARE FULLY ENGAGED.

DO NOT PLACE ANY PART OF THE OPERATOR'S BODY OR ALLOW ANYONE UNDER MINI-SKID ARMS OR ATTACHMENTS.

DO NOT REMOVE PROTECTIVE GUARDS ON MACHINE EXCEPT IN THE CASE OF MAINTENANCE.

DO NOT LUBRICATE, ADJUST OR REPAIR THE MACHINE WITH THE ENGINE RUNNING.

NEVER FUEL A HOT MACHINE.

DO NOT SMOKE WHEN FUELING OR OPERATING THE MACHINE.

ALWAYS READ THE OWNER'S MANUAL FOR PROCEDURES FOR SERVICING AND MAINTENANCE OF THE MINI-SKID.

REMEMBER, SAFETY FIRST.

T039375

II. CONTROLS

It is necessary to become familiar with the location and purpose of each control before operating the Mini-Skid.

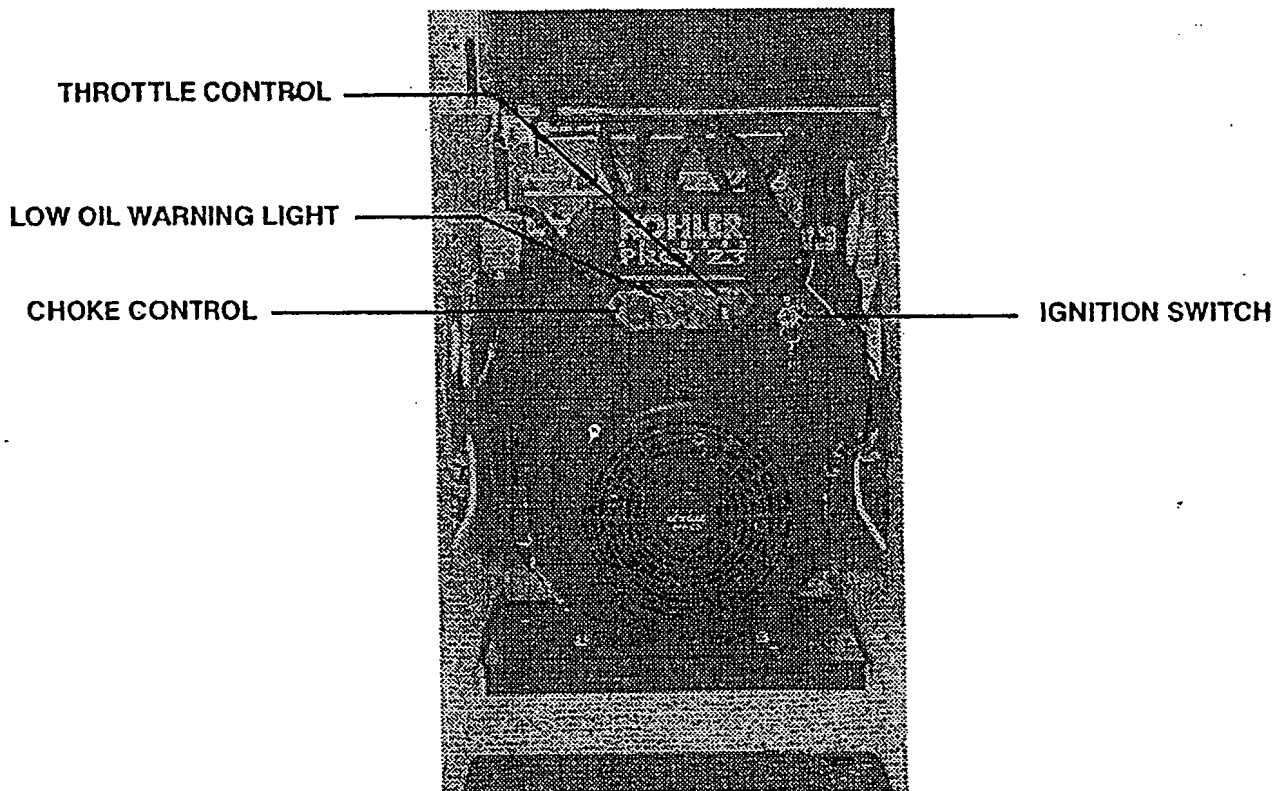


FIGURE 1 - GAS ENGINE CONTROLS
ENGINE CONTROLS - KOHLER 23 HP GASOLINE

IGNITION SWITCH - FIGURE 1

The ignition switch is a three position switch. Clockwise from the OFF position are the ON and START position.

THROTTLE CONTROL - FIGURE 1

When the throttle control lever is set fully to the right the engine is at idle speed. Pushing the control to the left increases the engine speed.

CHOKE CONTROL - FIGURE 1

Pull choke control out to start a cold engine. As the engine warms up push choke control in gradually.

LOW OIL WARNING LIGHT - FIGURE 1

This light illuminates if the engine oil is low. Stop the engine and add oil immediately if this light comes on.

IMPORTANT

*Be Sure Ignition Key Is In Off Position,
Or Even Removed, When The Engine
Is Not Running.*

IMPORTANT

*For Maximum Power While Working
The Engine Should Be Running At Full
Throttle.*

II. CONTROLS

It is necessary to become familiar with the location and purpose of each control before operating the Mini-Skid.

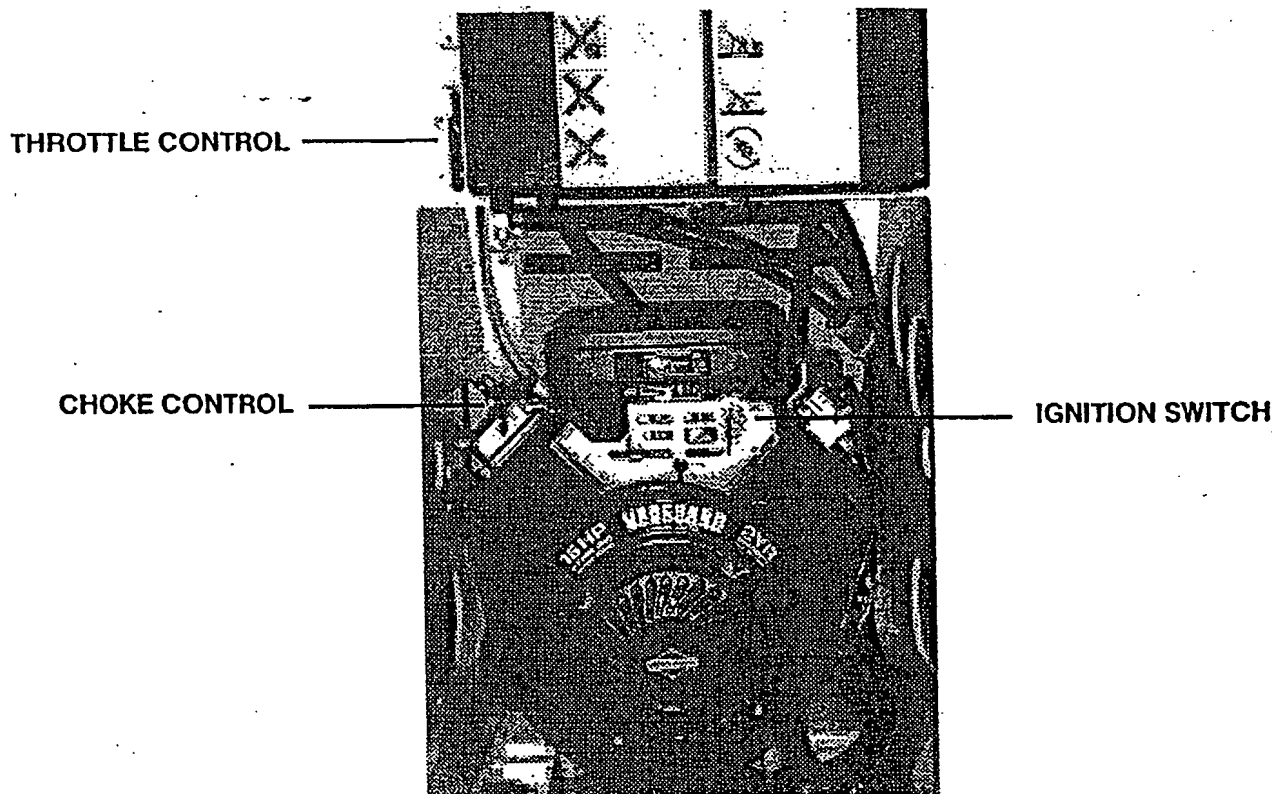


FIGURE 1A - GAS ENGINE CONTROLS

ENGINE CONTROLS - BRIGGS & STRATTON 20 HP GASOLINE

IGNITION SWITCH - FIGURE 1A

The ignition switch is a three position switch. Clockwise from the OFF position are the ON and START position.

THROTTLE CONTROL - FIGURE 1A

When the throttle control is set fully up the engine is at idle speed. Pushing the control downward increases the engine speed.

CHOKE CONTROL - FIGURE 1A

Pull choke control out to start a cold engine. As the engine warms up push choke control in gradually.

IMPORTANT

*Be Sure Ignition Key Is In Off Position,
Or Even Removed, When The Engine
Is Not Running.*

IMPORTANT

*For Maximum Power While Working,
The Engine Should Be Running At Full
Throttle.*

II. CONTROLS

It is necessary to become familiar with the location and purpose of each control before operating the Mini-Skid.

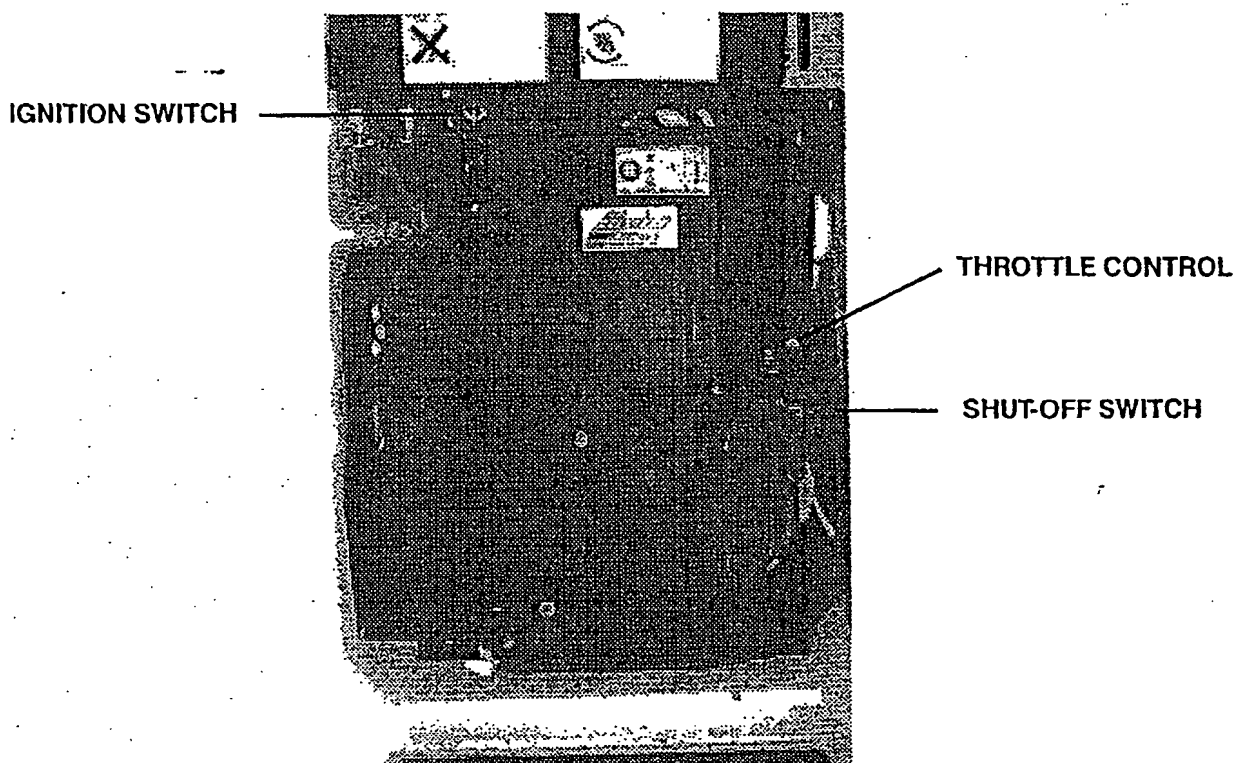


FIGURE 2 - DIESEL ENGINE CONTROLS

ENGINE CONTROLS - DIESEL

IGNITION SWITCH - FIGURE 2

The ignition switch is a three position switch. Clockwise from the OFF position are the HEAT and START position.

THROTTLE CONTROL - FIGURE 2

When the throttle control is set fully left the engine is at idle speed. Pushing the control sideways increases the engine speed.

FUEL SHUT-OFF - FIGURE 2

Shuts off fuel, pull back to stop and push forward to run.

IMPORTANT

*Be Sure Ignition Key Is In Off Position,
Or Even Removed, When The Engine
Is Not Running.*

IMPORTANT

*For Maximum Power While Working
The Engine Should Be Running At Full
Throttle.*

CONTROLS

The "Taskmaster" 900T features two independent hydraulic systems for loader and attachment operation.

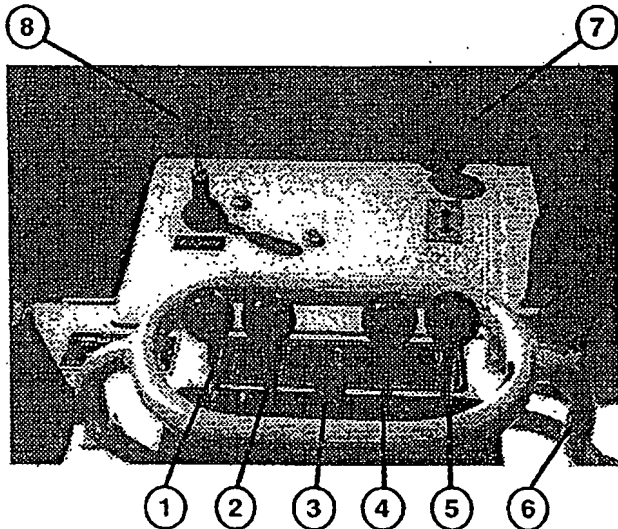
Each of these systems is powered by a separate hydraulic pump. The primary pump produces approximately 9 G.P.M. at full engine speed, while the secondary pump produces approximately 3 G.P.M.

One system is dedicated to attachment operation only, while the second system controls all other functions. The pumps can be instantly switched back and forth between the two systems as the need arises. For example, for normal loader operation, one would have the large, primary pump operating the loader.

However, if one was trenching, one would switch the pumps so that the primary pump was operating the trencher drive, while the small secondary pump was operating the loader thus allowing the operator to drive slowly while trenching.

All functions are controlled from the top consol of the Mini-Skid as shown in Figure 3.

FIGURE 3 - CONTROL PANEL



PRIMARY CONTROLS

1. Lift Arm Lever
2. Tilt Lever
3. Auxiliary Lever-Cylinder Operation
4. Left Hand Drive Lever
5. Right Hand Drive Lever
6. Grip Handle

SECONDARY CONTROLS

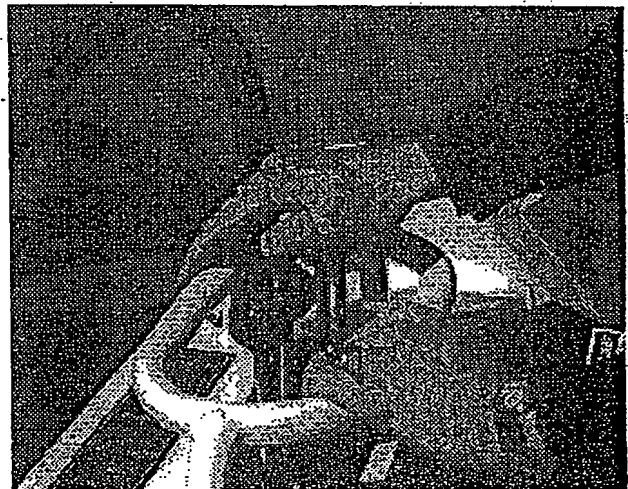
7. Flow Selector Knob
8. Auxiliary Lever - Hydraulic Motor Operation

The left hand drive lever controls the wheels on the left hand side and the right hand drive lever controls the wheels on the right hand side.

Engage the drive levers slowly because even a small movement of the levers will cause motion. All lever movements should be smooth and gradual. To drive the Mini-Skid straight forward, move both control levers forward the same amount. To drive the Mini-Skid straight backward, move control levers back the same amount.

The Mini-Skid is steered by moving one lever further forward than the other. To turn left, move the right lever further ahead than the left lever; to turn right, move the left lever further ahead than the right lever. For the Mini-Skid to go into a spin-turn, or "Skid Steer", move one lever forward and the other backward the same amount.

FIGURE 4



The "taskmaster" features single-handed steering. For normal operation, the most comfortable hand positions is to operate the two steering levers with the **palm** of the right hand, with the fingers gripping the grip handle. Flexing the fingers will allow forward travel, and simply rotating the palm will allow normal steering. To reverse, slip the palm back to the rear of the grip handle, and use the tips of the fingers to pull the steering levers backwards.

This position will allow for more precise control of the unit. At the same time, the left hand should grip the grip handle for operator stability, but can also be used to operate the tilt and dump functions as required.

WARNING

Do Not Move Any Of The Control Levers Unless Standing With Both Feet On The Platform And Holding The Grip Handles.

WARNING

Keep BOTH HANDS on the grip handle at all times when operating the machine.

WARNING

Use Extreme Caution When Stopping. If The Bucket Or Attachments Is Raised, The Machine Can Tip. Keep All Movements Smooth. All New Operators Must Work The Machine In A Safe Open Area To Become Familiar With Its Operating Characteristics.

LIFT CONTROL LEVER - FIGURE 3

The outside control lever located on the left hand side controls the lift. Pushing the lever forward lowers the lift arm and pulling the lever back raised the lift arm. In these two positions, the lever is spring centered to neutral upon release of the lever.

TILT CONTROL LEVER - FIGURE 3

The inside control lever located on the left hand side controls the tilting action of attachments such as buckets, forks, etc. Pulling the lever back tilts the attachment back. The lever is spring centered to neutral upon release.

IMPORTANT

Ensure That The Auxiliary Lever Is Kept In Neutral When Not Being Used To Avoid Wasting Power. Engine Is Difficult To Start If Lever Is Engaged. Hydraulic Oil May Also Overheat.

AUXILIARY CONTROL

LEVER-CYLINDER OPERATION - FIGURE 3

The 900T features two separate auxiliary systems. The auxiliary lever shown as item #3 in Figure 3 is part of the primary controls, and is located between the main levers. This control is connected to the pair of quick couplers located on the right side of the loader arms (Figure 9A).

This lever can be used to operate attachments such as post hole augers, trenchers, brooms, and so on, but is mainly intended to operate attachment hydraulic cylinders. This would include such attachments as angling dozer blades, grapple forks, paving stone movers, and loose material handlers, which must operate from this control only.

Pushing this lever forward extends the hydraulic cylinder, while pulling it back reverses the motion. This lever is not spring centered and must be returned to neutral (centre position) manually.

SECONDARY CONTROLS:

FLOW SELECTOR KNOB - FIGURE 3

The flow selector knob (item 7) is located ahead and to the right of the primary controls. This knob switches the pumps back and forth between the primary and secondary circuits. This is a "push-pull" knob, which moves up and down.

When this knob is pushed down, the large, primary pump is connected to the loader drives, and the smaller secondary pump is connected to the secondary auxiliary valve. This would be the normal position for most loader operations.

When this knob is pulled up, however, the pumps are reversed so that the larger, primary pump is connected to the auxiliary valve, while the smaller pump is operating the loader drives. This would be the position used when operating attachments such as trenchers, sweepers, roto-tillers, snowblowers, and post hole augers, as it provides for increased speed and power to the attachment while allowing a low speed drive for the loader itself.

As well, when the selector is in this position, it provides a low-speed drive which can be used to allow new operators a learning period to become familiar with operating the Mini-Skid.

When moving this knob up or down, stop the machine, reduce engine speed to an idle, and push or pull the knob quickly and cleanly to the new position. **Do not leave this knob in a middle position. Be sure it is either fully up or fully down.**

AUXILIARY LEVER-HYDRAULIC MOTOR OPERATION - FIGURE 3

This lever is located to the left and forward of the primary controls, and operates the set of auxiliary couplers located on the left front of the body as shown in Figure 9B.

This is a dedicated hydraulic motor control valve, to be used to operate such attachments as trenchers, post hole augers, sweepers, hammers, and similar units. **Do not connect hydraulic cylinders to this control!** When this control is in the neutral (center) position, the auxiliary couplers are connected together,

which provides a "free-wheeling" or "slow-down" position for hydraulic motors, preventing attachment damage and internal pressure buildups.

However, a hydraulic cylinder connected to this line will not hold pressure in the neutral position and will be free to move! This can result in damage or injury.

Always use the auxiliary couplers located on the loader lift frame for hydraulic cylinder use!

This lever operates side to side, moving the lever to the left provides oil pressure to the left coupler, while

moving it to the right pressurizes the right coupler. Centering the lever provides a neutral, off position. This lever locks in all three positions and must be moved manually between them.

Important! Ensure that this auxiliary lever is in the central neutral position when not being used to avoid wasting power. Engine is difficult to start, power is greatly reduced, and the hydraulic oil will overheat if this lever is engaged without an attachment connected to it!

ATTACHMENT LOCK PINS

ATTACHMENT LOCK PINS

The "Taskmaster" tool bar design allows changing from one attachment to another quickly and easily, without having to remove pins.

Attachments are secured on the unit with two spring loaded pins. Rotating the handles on the pins one-half of a turn moves the pins from the locked to the unlocked position.

To **unlock** attachments, rotate both pins so that their handles are both pointing to the **outside** of the tool bar, as shown in Figure 5.

To **lock** attachments, rotate both pins inwards so that both handles are pointing towards the **center** of the machine as shown in Figure 6. This will allow the springs to push the pins downwards through the mounting holes in the attachment and secure it to the unit.

WARNING

The design of the quick attach system is such that attachments can be lifted and carried without the lock pins being engaged. Before using any attachment, check to be sure that the lock pins are fully engaged and properly in place. The attachment will fall off when dumped if the lock pins are not engaged, resulting in possible damage or injury.

LOCK PINS DISENGAGED

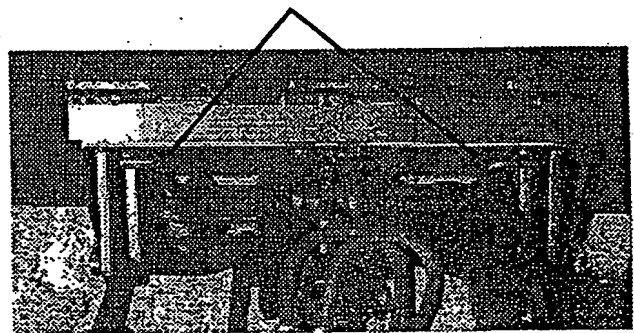


FIGURE 5

LOCK PINS ENGAGED



FIGURE 6

WARNING

After Hook-Up To Attachment, Check To Be Sure Lock Pins Are Fully Engaged, And Locked Into Position.

III. OPERATION

You can take full advantage of all the features of your **RAMROD Mini-Skid** by following the operating information presented here. The Mini-Skid has been designed to do a lot of work with a minimum of operating fatigue.

PRE-STARTING INSPECTION AND PREPARATION

Before you start the Mini-Skid for the first time each day, perform the following checks and service:

1. Check engine crankcase oil level.
2. Check engine fuel and open fuel shut-off valve if closed.
3. Check hydraulic fluid level in tank.
4. Check for fuel, engine oil or hydraulic leaks.
-WARNING- Never check for hydraulic leaks with your bare hand. High pressure fluid could penetrate your skin and cause injury.
5. Visually inspect all hoses, lines, fittings, tires, pivot points, mounting pins, nuts and bolts, safety shields and decals for possible failure or looseness.
6. Check that all controls are in the neutral position.

WARNING

Do Not Move Any Of The Control Levers Unless Standing With Both Feet On The Platform And Holding The Grip Handles.

STARTING PROCEDURE - GASOLINE ENGINE

1. Push the throttle lever down slightly.
2. Pull choke control completely out.
3. Turn the ignition switch to "ON" and then through to the "START" position. (If the engine fails to start by cranking for 10 seconds, wait 5 seconds before trying again).
4. As the engine warms up, push back the choke control gradually.
5. Set the throttle lever for idling speed. Avoid excessive engine speed during warmup.
6. To restart a warm engine - move throttle control slightly and turn ignition key to "START".

IMPORTANT

Do Not Crank Engine With Starter For More Than 10 Seconds At A Time, As This Will Overheat The Starter.

IMPORTANT

Ensure That The Auxiliary Lever Is Kept Neutral When Not Being Used To Avoid Wasting Power. Engine Is Difficult To Start If Lever Is Engaged. Hydraulic Oil May Also Overheat.

IMPORTANT

Do Not Put Mini-Skid Under Full Load Condition Until It Has Had An Adequate Warm-Up Period.

NOTE: For more information regarding engine starting and operation, refer to your Briggs and Stratton "Owner's Manual".

OPERATION

SHUT-OFF PROCEDURE - GASOLINE ENGINE

1. Park the Mini-Skid on level ground. If it is necessary to park on a slope, park across the grade and block the wheels.
2. Lower the lift arms and ground the bucket.
3. Return throttle control to "idle" position, and allow engine to idle for a short while.
4. Turn ignition key off.
5. Place control levers in neutral position, and remove the key.

IMPORTANT

*Be Sure Ignition Key Is In OFF Position,
Or Even Removed, When The Engine
Is Not Running.*

STARTING PROCEDURE - DIESEL ENGINE

1. Move fuel shut-off forward to the "On" position.
2. Open throttle lever slightly.
3. Turn key clockwise to the first, "Preheat" position and hold for a few seconds.
4. Turn key further clockwise to the "Start" position to crank engine.
5. Once engine starts, release key.
6. Set throttle lever to idling speed to allow engine to warm up.
7. If engine fails to start after cranking 10 seconds, repeat steps 3 and 4, allowing a longer "Preheat" period.
8. To restart a warm engine, move fuel shut-off to the "On" position and turn key to start.

SHUT-OFF PROCEDURE - DIESEL ENGINE

1. Park the Mini-Skid on level ground. If it is necessary to park on a slope, park across the grade and block the wheels.
2. Lower the lift arms and ground the bucket.
3. Move throttle to a slow idling position and allow the engine to run for a few minutes to cool down.
4. Pull fuel shut-off knob back to the "Off" position to stop engine.
5. Turn key counter - clockwise to the off position.

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MOUNTING ATTACHMENTS

INSTALLATION OF ATTACHMENT

1. Rotate lock pins to the unlocked position (handle pointing outwards).
2. Tilt the attachment frame forward as shown in **Figure 7**, so that the top round edge of the attachment frame will fit under the lip on the attachment.
3. Drive into the attachment, raising the arms so that the top of the attachment frame slips under the lip on the attachment, and attachment lifts slightly.
4. Using the tilt cylinder, roll back the attachment so it drops into place, as shown in **Figure 8**.
5. Rotate the lock pins to the locked position (handles facing inwards), and check that the lock pins are fully inserted through the lock holes in the attachment.
6. Connect attachment hydraulic hoses (if required) to the quick couplers as shown in **Figure 9**.

WARNING

After Hook-Up To Attachment, Check To Be Sure Lock Pins Are Fully Engaged, And Locked Into Position.

REMOVAL OF ATTACHMENT

1. Lower lift arms and tilt forward on the attachment so that the attachment is resting on the ground.
2. If attachment is hydraulically equipped, stop the engine, relieve hydraulic pressure in the attachment lines by shifting the auxiliary lever back and forth, and disconnect the attachment hydraulic hoses.
3. Rotate the lock pins to the unlocked (handles pointing outwards) position.
4. Start engine, tilt the attachment forwards (dump) until the top edge of the attachment mount frame clears the lip on the attachment, and back the Mini-Skid away from the attachment.

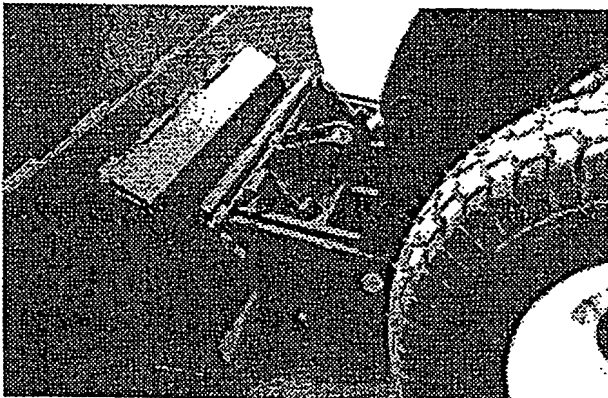


FIGURE 7

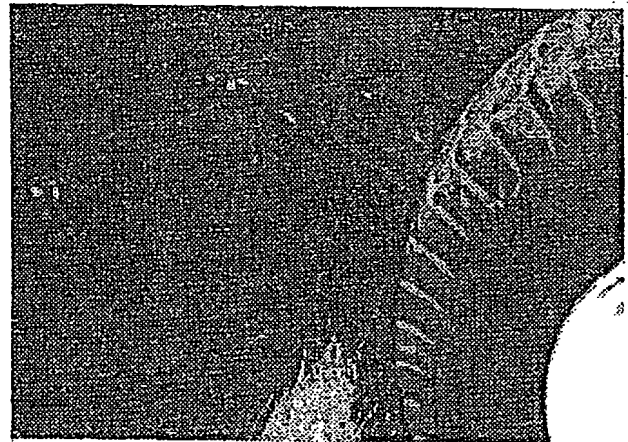


FIGURE 8

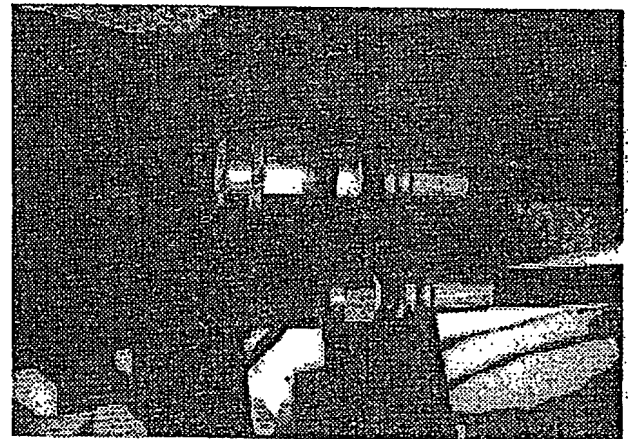


FIGURE 9A

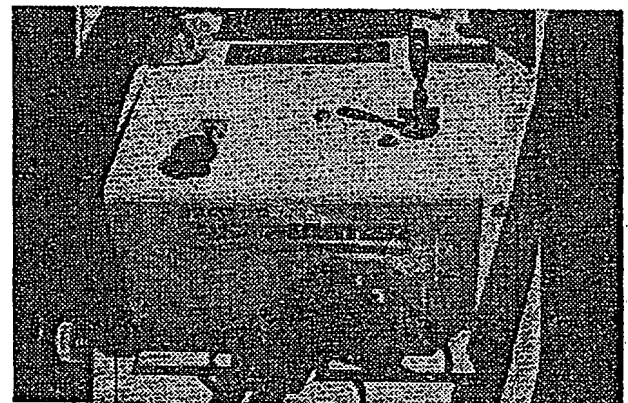


FIGURE 9B

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OPERATIONAL PROCEDURE

Mini-Skid operational procedure and suggestions in this manual are based on the use of a bucket. Operating procedure and suggestions for such other attachments as dozer blade, post hole auger, trencher, rock hammer, etc., are included in the respective attachment bundle.

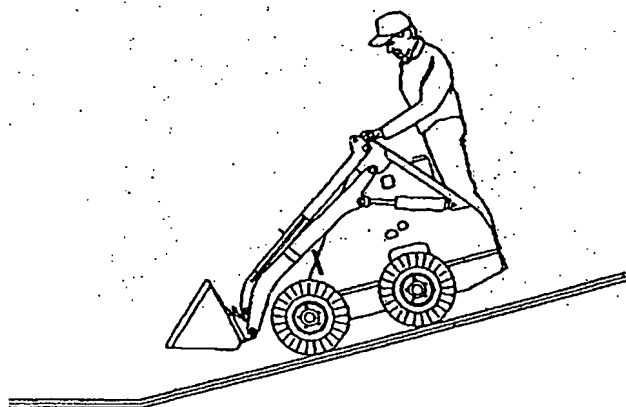


FIGURE 10 - EMPTY BUCKET

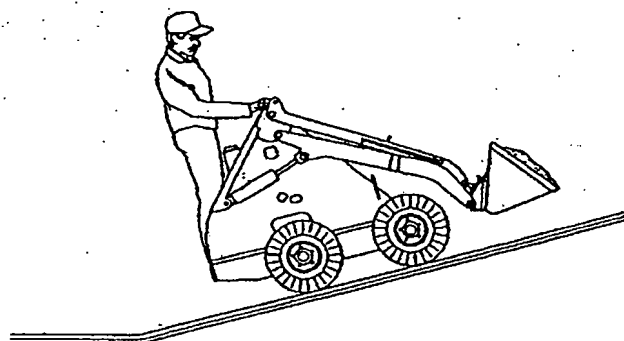


FIGURE 11 - FULL BUCKET

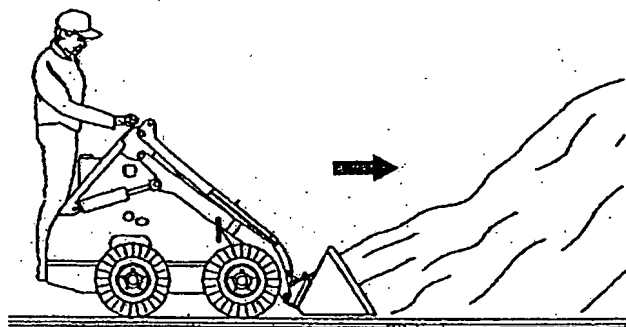


FIGURE 12

OPERATING SUGGESTIONS

1. Install an attachment (bucket). Drive carefully to a clean and level area and practice operating the Mini-Skid at a slow rate until familiar with the operation of all controls.
2. Hydraulic power transmission is instantaneous. When using the drive levers, sudden movement will result in acceleration to full speed and a very jerky ride. Use smooth and gradual movements when using the drive levers.
3. For efficient operation of the Mini-Skid, keep the work area small, and as level as possible.
4. Decrease cycle time by "SKID" turning rather than backing up, using a slow turn, then going forward.
5. When driving on slopes keep the heaviest end of the Mini-Skid upward. When driving on a slope with an empty bucket, back up the slope in reverse, and drive down a slope forward as in Figure 10. When driving on a slope with a load, drive up the slope forward and back down the slope in reverse as in Figure 11.
6. Fill the bucket to rated capacity. Turning is easier with a full load than with a partial load.
7. To increase machine life, let the engine warm completely before starting operations each day. Avoid "over-loading" or "lugging" the Mini-Skid.

WARNING

Always Carry The Bucket Low While Moving. Drive Directly Up And Down Instead Of Across A Slope.

WARNING

If Operating Mini-Skid Indoors, Make Sure Building Is Well Ventilated.

FILLING AND DUMPING A BUCKET

1. Approach the pile with the lift arms fully down and bucket cutting edge just skimming the top of the ground as in Figure 12.

OPERATION

2. As soon as the bucket is full, tilt bucket back and back away from the pile, as shown in Figure 13 and 14.
3. When dumping, raise bucket high enough to clear stock pile or sides of container being loaded.
4. Drive slowly forward until bucket is over dumping area and tilt bucket forward until it completely empties.
5. Tilt bucket, back up if necessary to clear container side and back away.

WARNING

Use Extreme Caution When Stopping. If The Bucket Or Attachment Is Raised, The Machine Can Tip. Keep All Movements Smooth And Gradual When Manoeuvring With Lift Arms Raised. All New Operators Must Work The Machine In A Safe Open Area To Become Familiar With Its Operating Characteristics.

WARNING

Never Step Off The Operator Platform With The Load Raised.

DIGGING WITH A BUCKET

1. Lower lift arms fully and tilt bucket forward until cutting edge is on the ground.
2. Drive machine forward slowly and continue to tilt bucket forward until it enters the ground to desired depth and then tilt it back a small amount to keep an even depth, as shown in Figure 15.
3. Continue driving forward until bucket is full and then tilt bucket fully back while driving slowly forward or stopping the machine.

LEVELLING

1. To spread material on uneven ground, raise lift arms and tilt bucket forward while driving slowly forward, as in Figure 16.

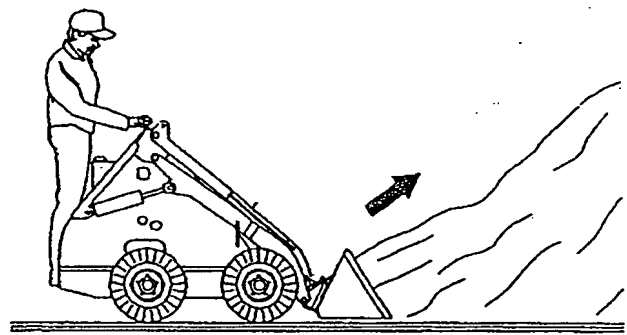


FIGURE 13

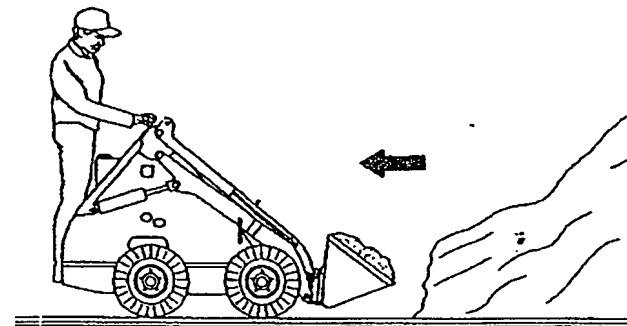


FIGURE 14

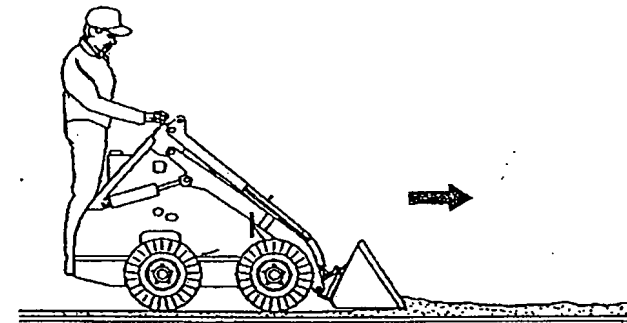


FIGURE 15

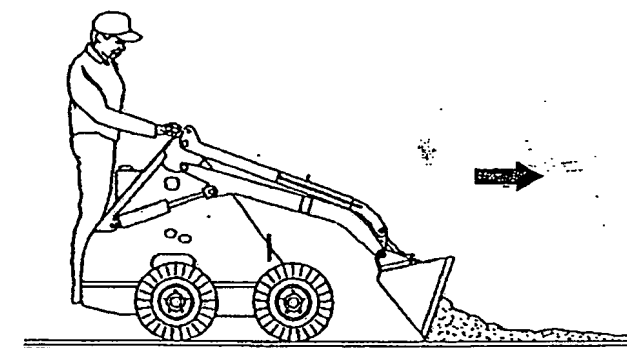


FIGURE 16

OPERATION

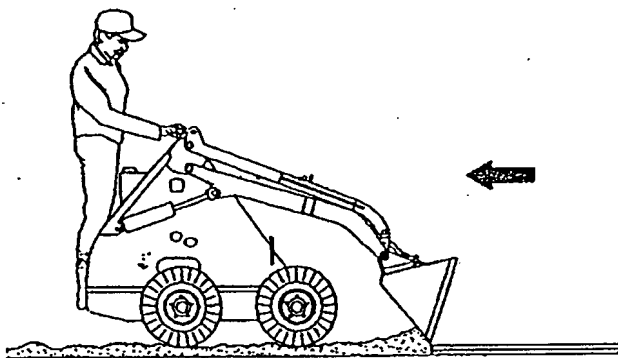


FIGURE 17

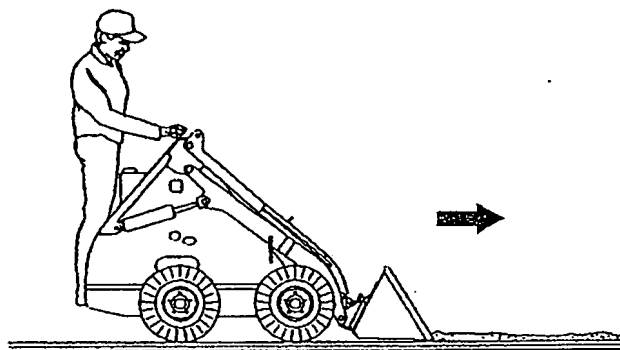


FIGURE 18

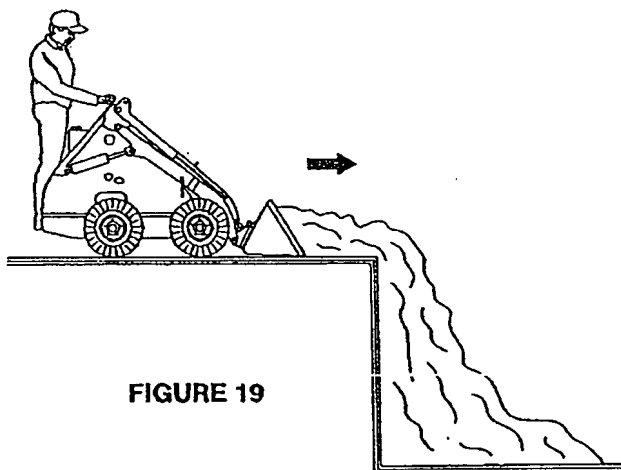


FIGURE 19

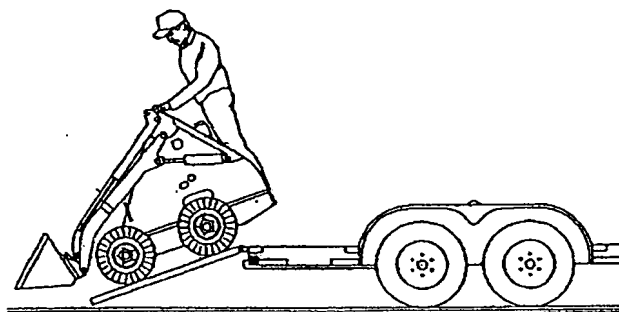


FIGURE 20

2. To level a filled area, tilt bucket forward and drive machine backwards to drag bucket and spread material, as in Figure 17.
3. Another method of levelling is to travel forward with bucket down and level, full of material and pushing excess into low areas. Depth is controlled by tilting the bucket slightly up or down, as in Figure 18.

BACKFILLING

1. When filling a trench or a hole, drive up the hole with bucket low or push material up to edge, as in Figure 19.
2. Tilt bucket forward as soon as it reaches the edge of the hole and when necessary raise the arms to empty the bucket.

TRANSPORTING THE MINI-SKID

IMPORTANT

*Never Tow The Mini-Skid.
Damage May Result.*

When the machine is transported on a truck or trailer, proper ramps must be used for loading.

A Mini-Skid with an empty bucket, or no attachment should be driven backwards up a ramp onto the trailer or forward down a ramp, as shown in Figure 20.

After the Mini-Skid is driven onto the transporting vehicle, lower any attachments, and install chains to hold Mini-Skid from moving during sudden stops or when travelling up and down grades.

Close the fuel valve when the Mini-Skid is to be transported. Vibration during transport could cause the carburetor to flood.

WARNING

When Transporting On A Road Or Highway During The Day Or At Night, Be Sure That The Trailer Is Equipped With Lights And Signs As Required By Law.

IV. MAINTENANCE

Maintenance and service of the Mini-Skid is made simple by the use of hydraulics for power transmission and the accessibility to the components.

Maintenance and service intervals recommended in this manual are based on operation under average conditions. When operating the Mini-Skid in severe conditions of heat, cold, dust, high humidity or other extremes, service the loader at more frequent intervals.

Failure to perform regular maintenance will result in damage to the Mini-Skid. Periodic maintenance and service is the key to trouble free operation.

When replacement parts are needed for Mini-Skid components, **Figure 21** on Page 15 shows a complete breakdown of the Mini-Skid. Page 16 & 17 shows the corresponding parts list containing item number, part number, description and quantity.

USING THE PARTS LIST

ITEM:

- The item number is the identifying number from the illustration.

PART NUMBER:

- The part numbers that appear in the part number column, are 7 digit numbers by which the components may be identified and ordered from us.

DESCRIPTION:

- This column contains the name and description of the part.

QUANTITY:

- This column shows the quantity of each part used on that Mini-Skid component.

ORDERING PARTS

When ordering parts from us, be sure to state:

- 1) Part Number
- 2) Full Description
- 3) Quantity Required

- 4) Mini-Skid Model and Serial Number

NOTE: The reference to right and left used throughout this manual, refers to the position when operating the machine, facing forward.

APPLIED WARRANTIES

Below are listed the warranties for the major components of the Mini-Skid as set by their respective manufacturers at the publication date of this manual. For the complete **RAMROD** warranty, refer to Page 33 of this manual.

For information on the engine warranty, refer to the Briggs and Stratton or Lister-Petter booklet.

HYDRAULIC PUMP

- 6 months from the time of 1st delivery to purchaser.

OVER CENTRE VALVE-FLUID CONTROL

- 6 months from the time of 1st delivery to purchaser.

WHEEL MOTOR

- 18 months from date shipped and/or 12 months from date installed.

BATTERY

- 9 months from time installed.

TIRES

- 12 months or 25% No Charge replacement on Factory defects. 4 year weather check.

CYLINDERS - RAM INDUSTRIES

- 12 months from date installed.

ASSEMBLY DIAGRAM

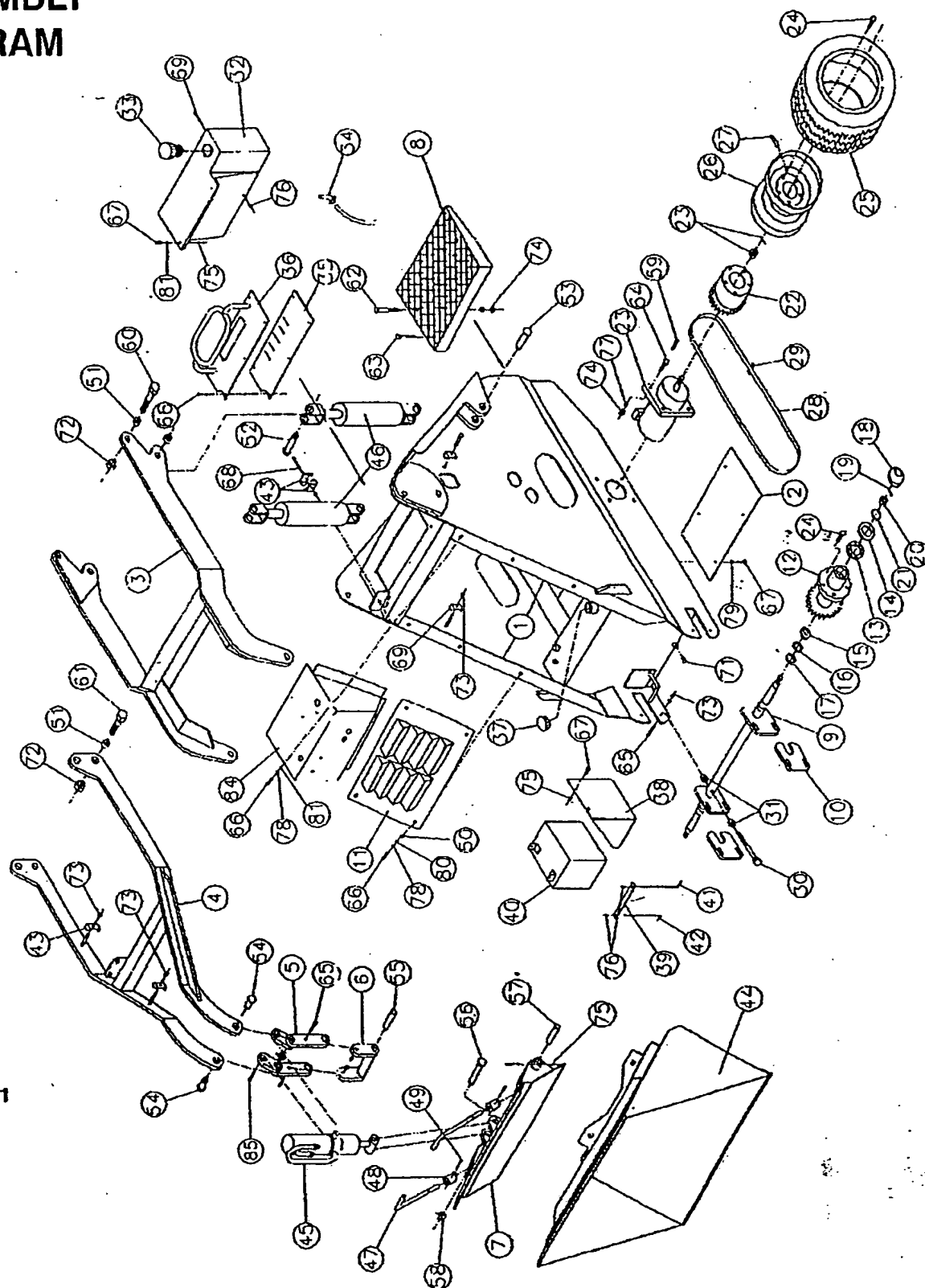


FIGURE 21

T039389

MAINTENANCE

RAMROD 900T PARTS LIST

Item	Part No.	Description	No. Used
1	1231000	Body Weldment	1
2	1231018	Bottom Plate	1
3	1231103	Lift Arms	1
4	1231109	Self Levelling Arms	1
5	1231111	Self Levelling Link (Left)	1
5	1231112	Self Levelling Link (Right)	1
6	1231123	Cylinder Spacer	1
7	1231122	Front Mount Frame	1
8	1144241	Counterweight	1
9	1231070	Front Axle	1
10	1231071	Axle Spacer (Not on all Models)	2
11	1117146	Front Cover (Plastic)	1
12	1230624	Front Hub/Sprocket Weldment (4" Tires)	2
12	1230619	Front Hub/Sprocket Weldment (6" & 8" Tires)	2
13	1135343	Cup, Bearing Race, Outer	2
14	1135344	Bearing, Roller cone, Outer	2
15	1135251	Cup, Bearing Race, Inner	2
16	1135250	Bearing, Roller Cone, Inner	2
17	1135252	Seal, Inner	2
18	1135345	Dust Cap	2
19	1102768	Cotter Pin	2
20	1105400	Slotted Nut	2
21	1102637	Machine Bushing	2
22	1230110	Rear Hub (6" Tires)	2
22	1230626	Rear Hub (6" & 8" Tires)	2
23	See Page 23	Hydraulic Motor c/w Nut & Cotter Pin	2
24	1135341	Wheel Bolt	20
25	1135070	Tire, 4.00 x 8 - 4 Ply	4
25	1135071	Tire, 16 x 6.5 - 8, 4 Ply	4
25	1135072	Tire, 18 x 8.5 - 8, 4 Ply	4
25	1135088	Tire, 16 x 6.5 - 8, Chevron Type	4
26	1135034	Rim, 8 x 4, 5 Bolt	4
26	1135035	Rim, 8 x 5.25, 5 Bolt	4
26	1135036	Rim, 8 x 7, 5 Bolt	4
27	1135154	Valve Stem	4
28	1113366	Drive Chain	2
29	1113349	Connector Link	2
30	1231023	Chain Tensioner Bolt	2
31	1102540	Hex Nut, 5/8" UNC	4
32	1117147	Fuel Tank	1
33	1179230	Fuel Filler Cap	1
34	1123206	Fuel Shut-Off Valve	1
35	1231061	Valve Grommet	1
36	1231059	Valve Cover Plate	1
37	1179194	Oil Filler Spout Cap	1
38	1230542	Battery Mount Bracket	1
39	1230534	Battery Cross Bar	1
40	1179130	Battery, 12 Volt	1
41	1230532	Long Battery Tie Bolt	1
42	1230533	Short Battery Tie Bolt	1
43	1707130	Line Clamp, 2 Pipe	6
44	1231024	Bucket, 31" Wide	1
44	1231027	Bucket, 36" Wide	1
44	1231030	Bucket, 42" Wide	1
45	1127336	Hydraulic Cylinder (Tilt)	1
46	1126288	Hydraulic Cylinder (Lift)	2
47	1231118	Quick Attach Pin	2
48	1231120	Pin Pivot	2
49	1102798	Roll Pin	2
50	1230684	Front Cover Spacer	6
51	1115510	"Connex" Spring Bushing	20
52	1230284	Top Lift Cylinder Pin	2
53	1231040	Bottom Cylinder Pin	2
54	1231042	Pin, 1" x 2 1/8"	3

MAINTENANCE

RAMROD 900T PARTS LIST continued

Item	Part No.	Description	No. Used
55	1231046	Drilled Pin, 1" x 8 3/8"	1
56	1231044	Pin, 1" x 3 1/2"	1
57	1231047	Drilled Pin, 1" x 2 5/8"	2
58	1500115	Pin Retainer	7
59	1127208	Key, Wheel Motor	2
60	1102255	Hex Bolt, 1" UNC x 4"	2
61	1102253	Hex Bolt, 1" UNC x 3"	2
62	1102567	Hex Bolt, 1/2" x 3 1/2"	2
63	1102055	Hex Bolt, 1/2" x 2 1/2"	2
64	1102051	Hex Bolt, 1/2" x 1 1/2"	8
65	1102002	Hex Bolt, 3/8" x 1 1/2"	6
66	1101990	Hex Bolt, 3/8" x 1"	16
67	1101950	Hex Bolt, 5/16" x 1"	4
68	1101929	Hex Bolt, 1/4" x 2 1/2"	2
69	1707125	Line Clamp, 4 Pipe	1
70	1102555	1" Hex Nut	2
71	1122919	Drain Plug	1
72	1102567	1" Jam Nut	2
73	1102526	3/8" Locknut	20
74	1102535	1/2" Hex Nut	12
75	1102520	Hex Nut	13
76	1102515	1/4" Hex Nut	3
77	1102592	1/2" Lockwasher	12
78	1102590	3/8" Lockwasher	12
79	1102589	5/16" Lockwasher	13
80	1102641	3/8" Flatwasher	12
81	1102607	5/16" Flatwasher	6
82	1102525	3/8" Nut	2
83	1102611	1/2" Flatwasher	4
84	1231154	Auxiliary Mount Plate	1
85	1231171	Cylinder Retaining Bolt	2

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BRIGGS & STRATTON GASOLINE/DIESEL ENGINE LAYOUT

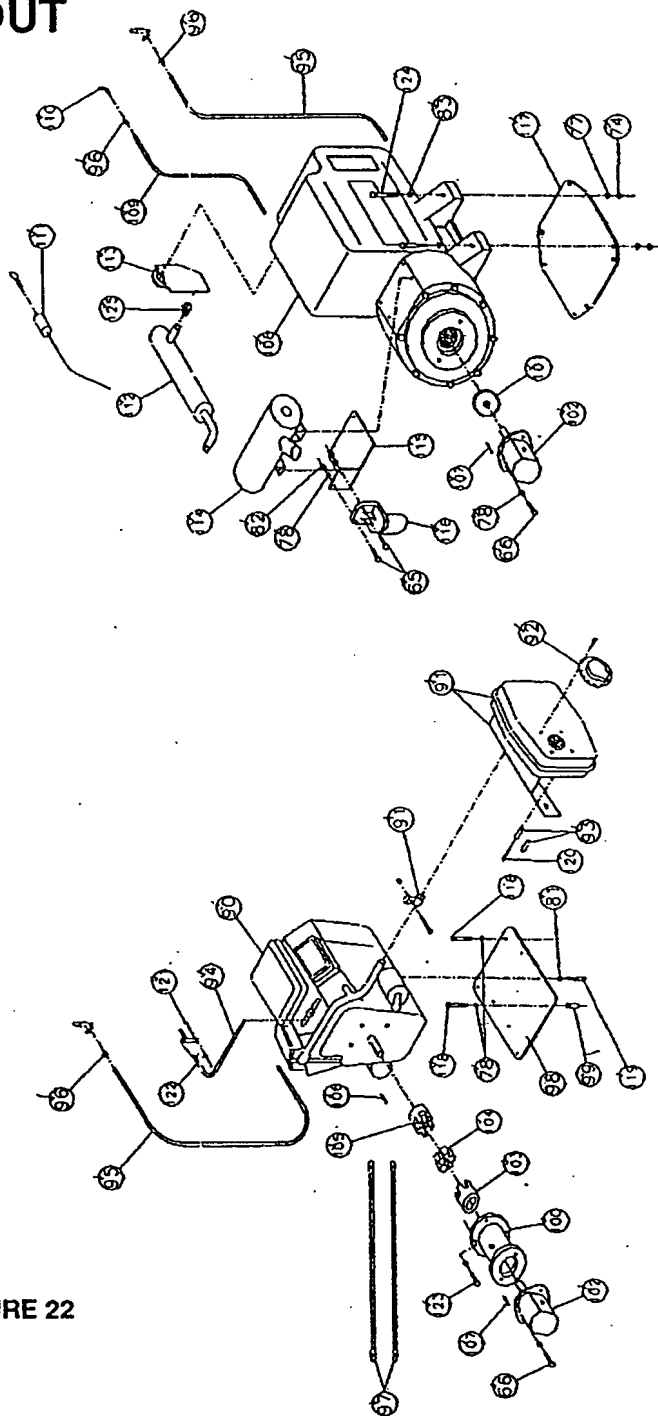


FIGURE 22

T039392

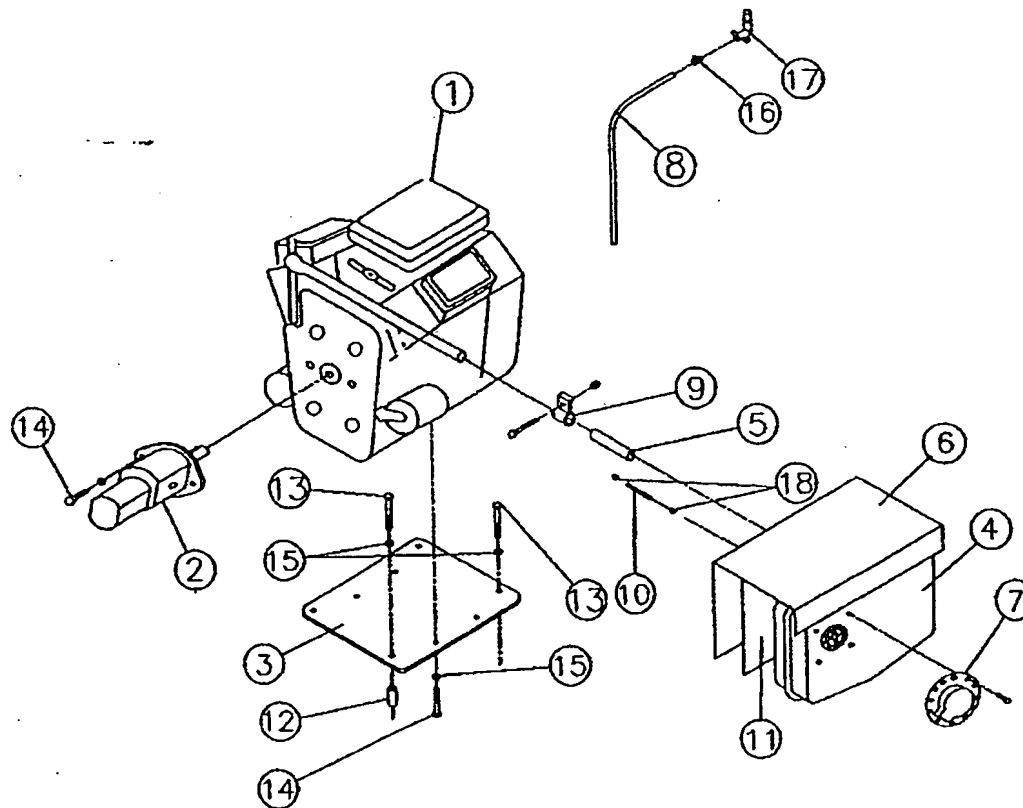
MAINTENANCE

ENGINE OPTIONS (Note - Parts Not Shown Twice Are Common To Both Gas And Diesel Models)

Item	Part No.	Description	No. Used
90	1117152	Gas Engine - Briggs & Stratton 20 hp	1
91	1123204	Muffler c/w Heat Shield and Clamp	1
92	1123205	Muffler Deflector	1
93	1230683	Muffler Spacer	2
94	1117125	Throttle Assembly	1
95	1123188	Gas Line	1
96	1123184	1/4" Gas Line Hose Clamps	2
97	1230541	Battery Cable	2
98	1231050	Motor Base Plate - Gas Engine	1
99	1230528	Motor Base Plate Spacer	4
100	1230351	Pump Mount Bracket - Gas Engine	1
101	1230365	Pump Coupler - Diesel Engine	1
102	See Page 23	Hydraulic Pump, B & P	1
103	1117074	Half Coupling	1
104	1117076	Spider	1
105	1117083	Half Coupling - Gas Engine	1
106	1105190	Key - Engine	1
107	1127207	Key - Pump	1
108	1179255	Diesel Engine - Lister Petter #LPA-2	1
109	1117260	Fuel / Return Line	2
110	1179261	Barbed Connector - Return Line	1
111	1179256	Diesel Keyswitch Box	1
112	1179257	Muffler - Diesel Engine	1
113	1231065	Muffler Extension	1
114	1179258	Air Cleaner Assembly	1
115	1231021	Fuel Filter Mount Plate	1
116	1179259	Fuel Filter Assembly	1
117	1231020	Motor Mount Plate - Diesel Engine	1
118	1102004	3/8" x 2 1/2" Bolt	4
119	1101954	5/16" x 2" Bolt	7
120	1101927	1/4" x 1 3/4" Bolt	2
121	1101942	#10 Hex Head Screw	2
122	1102578	#10 Hex Nut	2
123	1101975	5/16" x 1" U.N.F. Hex Bolt	4
124	1102053	1/2" x 2" Bolt	4
125	1179262	Muffler Clamp	1

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MAINTENANCE

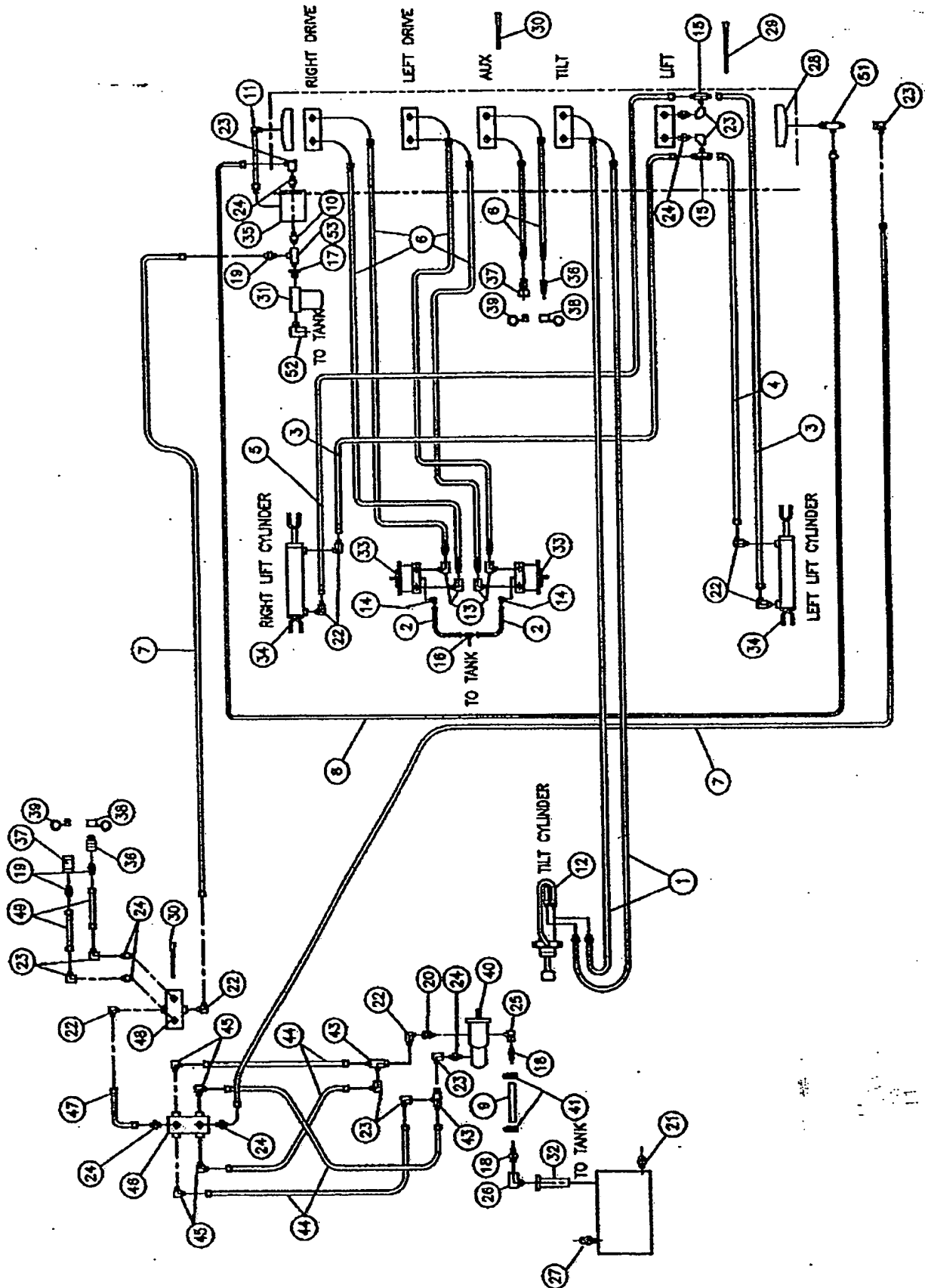


KOHLER 23 HP ENGINE LAYOUT

Item	Part No.	Description	No. Used
1	1179269	Gas Engine - Kohler 23 Hp	1
2	1172970	Twin Hyd. Pump - Splined Shaft	1
3	1231053	Motor Base Plate - Kohler	1
4	1179275	Muffler	1
5	1179276	Muffler Extension	1
6	1231058	Heat Shield (Outer)	1
7	1179277	Exhaust Deflector	1
8	1123183	Fuel Line	1
9	1102425	Muffler Clamp	1
10	1231069	Muffler Mount Screws	4
11	1231049	Heat Shield (inner)	4
12	1230529	Motor Base Plate Spacer	2
13	1102004	3/8" x 2 1/2" Bolt	4
14	1102003	3/8" x 2" Bolt	4
15	1102590	3/8" Lockwasher	8
16	1123184	1/4" Gas Line Hose Clamps	2
17	1123206	Fuel Shut-Off Valve	1
18	1102515	1/4" Nuts	8

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HYDRAULIC PARTS LAYOUT



MAINTENANCE

Item	Part No.	Description	No. Used
1	1123207	3/8" x 87" 100R2 Hose	2
2	1123270	14" x 13" 100R1 Hose (Charlynn Motors Only)	2
3	1123208	3/8" x 32" 100R2 Hose	2
4	1123217	3/8" x 25" 100R2 Hose	1
5	1123209	3/8" x 36" 100R2 Hose	1
6	1123218	3/8" x 50" 100R2 Hose	6
7	1123447	1/2" x 30" 100R2 Hose (JICF x 2)	2
8	1123446	3/8" x 28" 100R1 Hose	1
9	1123162	3/4" Suction Hose	1
10	1124717	Adaptor, 1/2" NPTM x 3/4" ORBM	1
11	1128039	1/2" x 21" SWB Hose	1
12	1127336	Tilt Cylinder	1
13	1124735	7/8" ORBM x 1/2" Elbow	4
14	1124467	1/4" ORBM x 1/4" JICM Elbow	2
15	1124400	1/2" JICM Tee	2
16	1124466	1/4" JICM (2) x 1/4" NPTM Tee	1
17	1122898	3/4" NPTM x 1/2" NPTF Reducer Bushing	1
18	1124589	3/4" NPTM x 3/4" Barbed Union	2
19	1124407	Adaptor, 1/2" NPTM x 1/2" JICM	3
20	1124938	Reducer, 7/8" ORBM x 3/4" ORBF	1
21	1122919	3/8" NPT Plug	1
22	1123210	3/4" ORBM x 1/2" JICM Elbow	7
23	1124405	1/2" JICF x 1/2" JICM Elbow	9
24	1123212	9/16" ORBM x 1/2" JICM Adaptor	7
25	1122941	1 1/16" ORBM x 3/4" NPTF Elbow	1
26	1124468	3/4" NPT Street Elbow	2
27	1124461	Breather Plug	1
28	1128335	Valve Assembly - Valvoil	1
29	1128336	Long Valve Handle	4
30	1128320	Short Valve Handle	2
31	1127100	Filter Assembly	1
32	1127202	Strainer Assembly	1
33	1127350	Hydraulic Motor (Charlynn)	1
or	1127451	Hydraulic Motor (Ross)	1
34	1126288	Hydraulic Cylinder	2
35	1127330	Overcenter Valve	1
36	1127184	Nipple	2
37	1127183	Coupler	2
38	1127185	Dust Cap	2
39	1127186	Dust Plug	2
40	1179253	Twin Hydraulic Pump - Keyed Shaft	1
OR	1172970	Twin Hydraulic Pump - Splined Shaft	1
41	1123290	Hose Clamps	2
42	1124478	Tee, 1/2" NPTM x 1/2" NPTF x 2	1
43	1124422	Tee, 1/2" JICF x 1/2" JICM x 2	2
44	1123423	3/8" x 24" 100R2 Hose	4
45	1122804	9/16" ORBM x 3/8" JICM Elbow	4
46	1179254	Selector Valve	1
47	1123449	3/8" x 8 1/2" 100R2 Hose	1
48	1179263	Control Valve-Aux. Motors	1
49	1128079	Hydraulic Line	2
50	1123372	Tee, 3/4" ORBM x 1/2" JICM	1
	1107358	Bolt 8mm x 1.25 x 2.5 cm (Valve Mount)	4
	1128287	Seal Kit, Lift Cylinders	REF
	1128406	Seal Kit, Tilt Cylinder	REF

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FUELS, LUBRICANTS AND CAPACITIES

The service obtained from your Mini-Skid is greatly affected by the quality of the petroleum products used in it. It requires only common products which are commercially available through the outlets of major refineries. The following chart shows which lubricant to use in the various components of the Mini-Skid.

COMPONENT	TEMPERATURES	TYPE OF LUBRICANT/FLUID	CAPACITY Litre (Imp. Gals.)
Engine Oil - must see Briggs & Stratton or Lister Petter Motor Specifications	Above 25°C (77°F) 0° to 25°C (32° - 77°F) -15°C to 0°C (5° - 32°F) Below -15°C (5°F)	SAE 30 SAE 10W SAE 10W SAE 5W30	1.6 Litres (1.4 Imp. Gal.)
Fuel Tank	All Temperatures	91 Octave, Regular	8.5 L. (1.8 Imp. Gal.)
Hydraulic Oil Reservoir	Above 10° C (50° F) Below 10° C (50° F) Below -29°C (-20°F)	SAE 10 W 30 Hyd Oil Dextron II or III Preheat Oil	44 Litres (39 Quarts)

NOTE: For warm climates a 20 or 30 weight hydraulic oil can be used in place of Dextron II

WARNING

*Never Add Fuel To A Mini-Skid When
The Engine Is Running Or Is Hot.*

WARNING

*Do Not Service Mini-Skid While Engine
Is Running*

FIGURE 24



GASOLINE - ENGINE OIL DRAIN LOCATION

FIGURE 25



DIESEL - ENGINE OIL DRAIN LOCATION

FUEL FILTER SPOUT

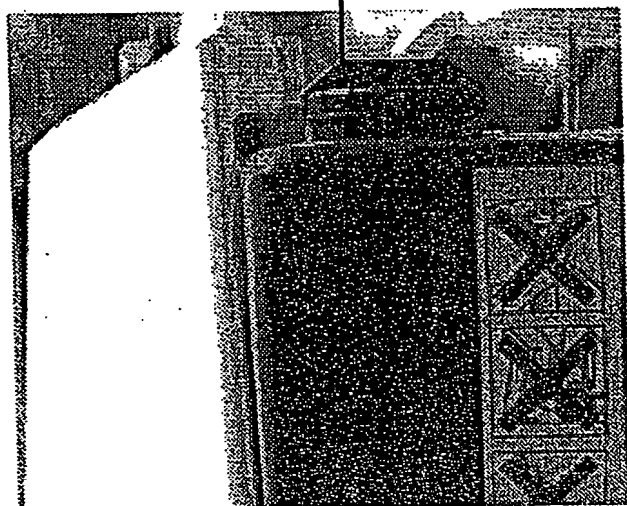


FIGURE 23

MAINTENANCE

ENGINE MAINTENANCE

OIL LEVEL CHECK

1. Ensure that the Mini-Skid is standing level.
2. Remove dipstick on the right hand side of the engine, **Figure 26**, visibly check the level. Top up with recommended oil; see the chart on Page 24 if required.

For proper engine maintenance, refer to your Engine Owner's Manual. This pertains to all applicable maintenance on your engine. Maintenance with respect to fluids and lubricants are included in the "Periodic Maintenance and Service Schedule"; on Page 27.

NOTE: Spark Plug Removal

The spark plug is removed by removing spark plug wire and inserting a 5/8" socket wrench through the access holes on either side of Mini-Skid.

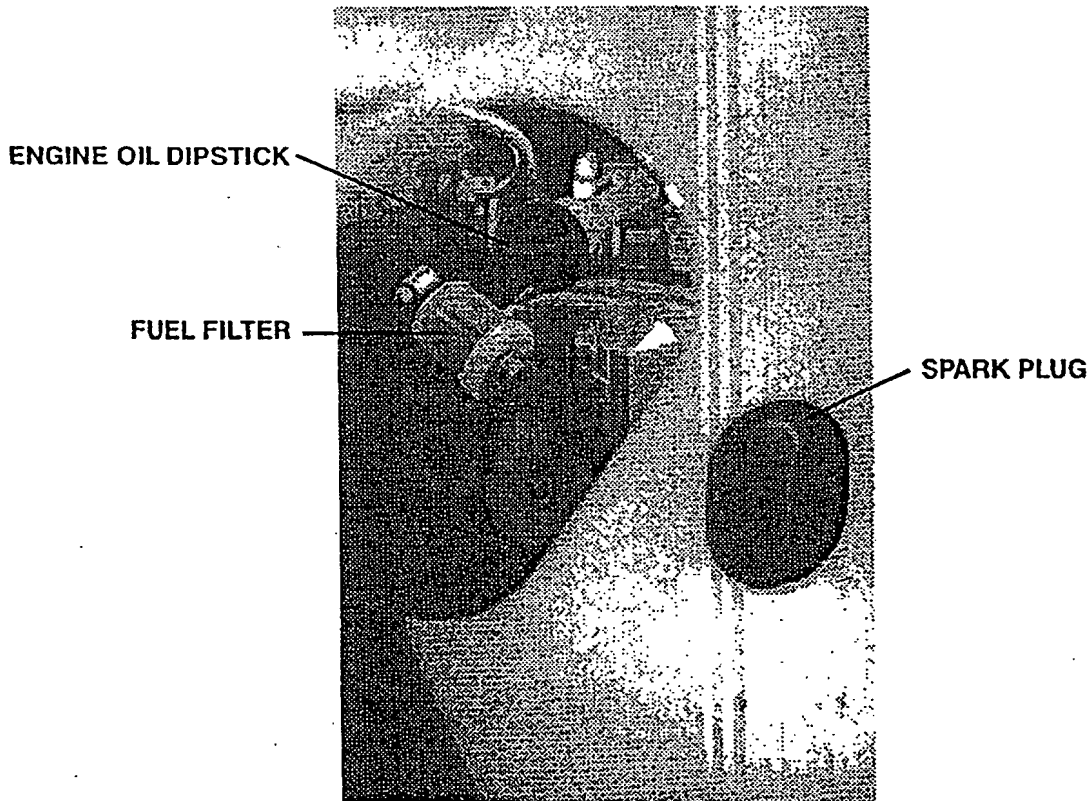


FIGURE 26

BATTERY MAINTENANCE

Note: Remove the Plastic front cover. Check the battery hold down bracket for tightness. Do not overtighten.

Remove any acid corrosion from the battery terminals and cables with baking soda and water solution. Coat the terminals with a high temperature grease.

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HYDRAULIC/HYDROSTATIC SYSTEM MAINTENANCE

NOTE: Remove the plastic front cover for access.

HYDRAULIC
OIL FILTER

BATTERY



FIGURE 27

HYDRAULIC OIL
OIL DRAIN

HYDRAULIC OIL
FILTER CAP



FIGURE 28

HYDRAULIC OIL LEVEL CHECK

1. Ensure that the Mini-Skid is standing level, the lift arms are down and the tilt cylinder is closed.
2. Remove the oil cap, see Figure 27, and check the level. If oil is apparent, the level is satisfactory.
3. If necessary, add the proper type and grade of oil, until it appears at the check point.

CHANGING HYDRAULIC OIL

The hydraulic oil normally needs to be changed after 1,000 operating hours or annually. However, if the oil becomes contaminated, or a major repair has been done to the hydrostatic transmission, it should be changed at once.

1. Remove the oil drain plug. See Figure 28, and drain the oil. Remove the oil cap to ensure a better flow.
2. Replace the oil drain plug, and refill reservoir with clean oil of proper grade and type.
3. Start engine, and check for leaks. Stop engine and re-check the oil level.

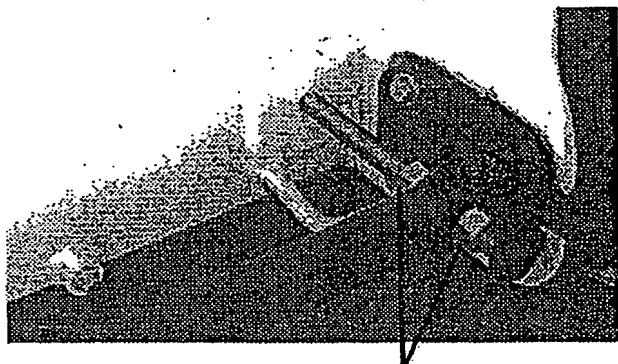
CHANGING HYDRAULIC OIL FILTER

1. With the engine stopped, unscrew and remove the old oil filter, see Figure 28.
2. Clean the oil filter mounting flange.
3. Apply a thin film of oil to the sealing ring and screw the new filter into place. Hand-tighten the filter.
4. Start the engine and check for leaks. Stop the engine, and check the hydraulic oil level.

IMPORTANT

*Do Not Allow Dirt To Enter Into
The Hydraulic/Hydrostatic System*

FINAL DRIVE MAINTENANCE



ADJUSTING NUTS

DRIVE CHAIN

To obtain proper chain tension, adjust the 4 tensioning nuts, (2 each side) to move the front axle forward or backwards. See Figure 28.

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MAINTENANCE

PERIODIC MAINTENANCE AND SERVICE SCHEDULE

ITEM	MANUAL	SERVICE REQUIRED	HOURS OF OPERATION				
			8 OR DAILY	25 OR WEEKLY	50 OR BI-WEEKLY	100 OR MONTHLY	1000 OR ANNUALLY
Engine Oil	Ramrod Manual	Check level of engine oil and top up if necessary.	X				
Engine Fuel	Ramrod Manual	Check level, and if necessary, top up.	X				
Hydraulic Oil	Ramrod Manual	Check level, and if necessary, top up.	X				
Tires and Wheel Nuts	Ramrod Manual	Check tire pressure and wheel nuts.	X				
Decals	Ramrod Manual	Check if damaged safety or instruction decals Replace if necessary.	X				
Engine Oil	Engine Manual	Change oil after first 20 hours of operation.			X		
Wheel Drive Chain	Ramrod Manual	Check and adjust tension if necessary.		X			
Air Cleaner	Engine Manual	Service element.		X			
Battery	Ramrod & Engine Manuals	Clean and protect battery terminals.			X		
Engine Oil	Engine Manual	Replace engine oil.				X	
Fuel Filter	Engine Manual	Clean and dry thoroughly.				X	
Spark Plug	Engine Manual	Clean and check gap.				X	
Hydraulic System	Ramrod Manual	Check all hoses, tires, fittings, etc. thoroughly. Replace if needed.				X	
Hydraulic Oil Filter	Ramrod Manual	Replace oil filter.				X	
Hydraulic Oil	Ramrod Manual	Change hydraulic oil.					X
Engine Oil Filter	Engine Manual					X	

T039400

TROUBLE SHOOTING

The following chart is intended to help isolate troubles and possible remedies.

SYMPTOM	POSSIBLE CAUSES	POSSIBLE REMEDIES
Starter does not crank engine	Low battery output Loose or disconnected battery cable	Recharge or replace battery Check and tighten all connections
Engine turns over but does not start	No fuel in tank. Fuel shut-off valve closed Improper starting procedure Auxiliary control lever engaged Spark plug fouled	Fill tank with clean fuel Open fuel shut-off valve Refer to starting procedure Set auxiliary lever to neutral Check spark plug gap and clean or replace spark plug
Noisy hydrostatic system	Air in system Loose suction line and/or fittings Clogged oil filter Hydraulic oil too heavy Internal pump or motor damage	Check oil level, add if necessary Bleed system Tighten all fittings and connections Replace oil filter Warm up hydraulic oil when too cold See your RAMROD Dealer
Erratic or no output on transmission	Hydraulic oil too heavy Hydraulic oil level too low Drive coupling between engine and pump broken	Use proper viscosity oil. Refer to Page 22. Check oil level. Add if necessary Check couplings, replace if necessary
Loss of hydraulic oil flow from gear pump	Reservoir low on oil Drive couplings between engine and pump broken Hydraulic gear pump not functioning	Check oil level. Add if necessary Check couplings, replace if necessary Inspect and repair if necessary
Hydraulic cylinders do not function properly	Loss hydraulic flow from gear pump Air in system	See above Bleed system
Oil overheating	Reservoir low on oil Auxiliary control lever engaged Setting of relief valve too high or too low	Check oil level. Add if necessary Return auxiliary level to neutral Set to correct pressure
No drive of either wheel on one side	Key sheared on motor shaft	Inspect shaft and hub for damage or wear. Replace key and tighten on slotted nut.
No drive of front wheel on one side	Chain failure	Inspect and replace
Noisy operation	Chains too loose Chains dry	Tighten chain Lubricate chain

MINI-SKID SPECIFICATIONS

900T MINI-SKID

900T

Rated Operating Capacity 900 lbs (409 Kg)
1400 (636 mm)

Shipping Weight: (Crated)

with 6" wheels, gasoline engine 1450 lbs (659 Kg)
with 8" wheels, gasoline engine 1460 lbs (663 Kg)
with 6" wheels, diesel engine 1600 lbs (727 Kg)
with 8" wheels, diesel engine 1610 lbs (732 Kg)

Travel Speed 3.5 mph (5.6 kph)

DIMENSIONS: (4" (10.2 cm) Wide x 8" (20 cm) Rim)

A. Overall Operating

Height 81 $\frac{3}{4}$ " (2076 mm)

B. Height to Hinge Pin 65.00" (1651 mm)

C. Overall Height of Mini-Skid 50 $\frac{1}{8}$ " (1276 mm)

D. Overall Length with

31" Bucket 80 $\frac{3}{8}$ " (2041 mm)

E. Dump Angle 85 deg

F. Dump Height @ 45 deg

Dump Angle 45 $\frac{1}{4}$ " (1149 mm)

G. Reach, Fully Raised @

45 deg Dump Angle 16.00" (406 mm)

H. Height to Bottom of

31" Bucket 59.00" (1498 mm)

I. Maximum Roll Back at

Ground 30 deg

J. Maximum Roll Back

Fully Raised 30 deg

K. Wheel Base 27 $\frac{1}{2}$ " (698 mm)

L. Overall Length Less

Bucket 61.00" (1549 mm)

M. Ground Clearance 5 $\frac{1}{2}$ " (139 mm)

N. Angle of Departure 26 deg

O. Clearance Circle

Without Bucket 28.00" (712 mm)

P. Clearance Circle With

31" Bucket 48.50" (1232 mm)

Q. Clearance Circle Rear 34.50" (876 mm)

R. Overall Width Without

Bucket 35.00" (889 mm)

S. Tread Width 29.00" (737 mm)

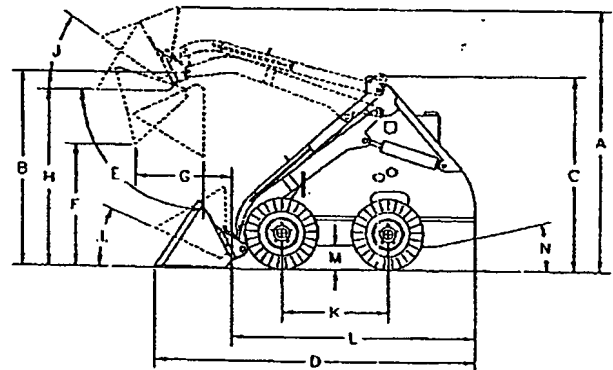
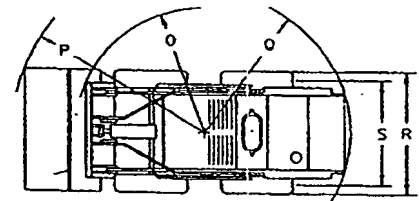


FIGURE 29



NOTE: 8" (20 cm) Wide x 8" (20 cm) Rim will increase machine dimensions as follows: All vertical dimensions will decrease by 0.50" (13 mm).

G. Reach, Fully Raised

@ 45 deg Dump Angle 15.00" (552 mm)

R. Overall Width Without

Bucket 39.00" (991 mm)

S. Tread Width 31.00" (787 mm)

T039402

MINI-SKID SPECIFICATIONS

900T MINI-SKID ENGINE - GASOLINE - 23 HP

Make and Model Kohler Command Pro 23
Cycle, Valve Arrangement 4 cycle, Overhead Valve
Displacement 41.1 cu in (674 cc)
Maximum Output (Horsepower) 23 hp (17 KW) @ 3600 RPM
Dry Weight (Mass) 90 lbs (41 Kg)

ENGINE - GASOLINE - 20 HP

Make and Model Briggs & Stratton 20 hp Vanguard
Cycle, Valve Arrangement 4 cycle, Overhead Valve
Displacement 40.00 cu in (656 cc)
Maximum Output (Horsepower) 20 hp (15 KW) @ 3600 RPM
Dry Weight (Mass) 82 lbs (35 Kg)

ENGINE - DIESEL

Make and Model Lister Petter LP4-2
Cylinders 2 cycle, Air Cooled Direct Injection
Displacement 44.00 cu in (726 cc)
Maximum Out put (hp) 16.0 @ 3600 RPM
Dry Weight (Mass) 110 lbs (50 Kg)

HYDROSTATIC/HYDRAULIC SYSTEM & FINAL DRIVE

Pump Gear Type, Fixed Displacement, 0.58 + 0.17 cu in/rev (9.6 + 2.9 cc/rev)
Pump Capacity 8.5 + 2.6 USGPM (13 + 4 l/min) @ 3600 RPM
Motor Fixed Displacement, 18.7 cu in/rev (305 cc/rev)
Control Valve 5 Spool, Series Parallel, Spring Return and Detent on Auxiliary
System Relief Pressure (Max) 3000 PSI (200 Bar)
Filtration Return Line: 10 Micron
Cylinders (3) Double Acting 2.50 Bore, 8.00 Stroke, 1.25 Rod
Final Drive Primary Chain Number ASA 60

ELECTRICAL

Battery 12 Volt, Negative Ground, 220 Amp

FLUID CAPACITIES

Fuel Tank 2.2 US gal (8.3 litres)
Engine Oil with Filter change 3.5 US pints (1.6 litres)
Engine Oil 3.0 US pints (1.4 litres)
Hydraulic Oil Reservoir 11.6 US gal (44 litres)

TIRES AND BUCKETS

TIRE

6" (15.2 cm) Wide x 8" (20 cm) Rim 30 psi (207 KPa)
8" (20 cm) Wide x 8" (20 cm) Rim 20 psi (138 KPa)

PRESSURE

BUCKET

36" (914 mm) 3.30 cu ft (0.09 cu M)
42" (1067 mm) 3.85 cu ft (0.11 cu M)

CAPACITY

MINI-SKID SPECIFICATIONS

DECALS

Operating Instructions

Part No. 179150

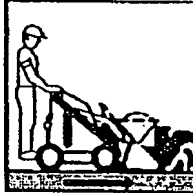
Location: Far L/H side on rear face

OPERATING INSTRUCTIONS

Hydraulic power transmission is instantaneous. When using the drive levers, sudden movement will result in acceleration to full speed and very jerky ride. Ease the levers either forward or reverse.

If the bucket is pivoted down while the arms are down, the front of the Mini-Skid will lift off the ground. This is a standard operation when scraping and leveling. The standing platform will prevent the Mini-Skid from overturning backwards.

HINTS FOR USE



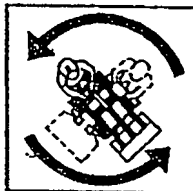
1. When attacking the heap or pile, always have the bucket level. To achieve this, lower the Mini-Skid arm and activate bucket tilt cylinder to bring the bucket level with the ground.

2. Towards the end of the run when the bucket is nearly full, gently roll the bucket backwards. This decreases the lifting resistance when the arms are raised and promotes an efficient tear out.

3. When transporting material in the bucket on hill-sides or rough ground, keep the bucket close to ground level. This lowers the centre of gravity of the Mini-Skid and maximizes stability.

4. When scraping, leveling and surface stripping, lower the bucket to ground level, tilt it down and so raise the front wheels slightly off the ground. Drive forward using the back wheels, the bucket will bite into the soil as you move forward.

5. The material may then be dumped into a trailer or utility truck for removal or repositioning on the site. Do not step off the operator platform with the load raised.



Manoeuvring is made possible by individual controls for the hydraulic motor on each side of the Mini-Skid. A turn may be achieved by varying the amount and/or direction of power supplied to each side of the machine. The machine is capable of turning in its own length by applying equal forward and reverse power to opposite sides of the machine.

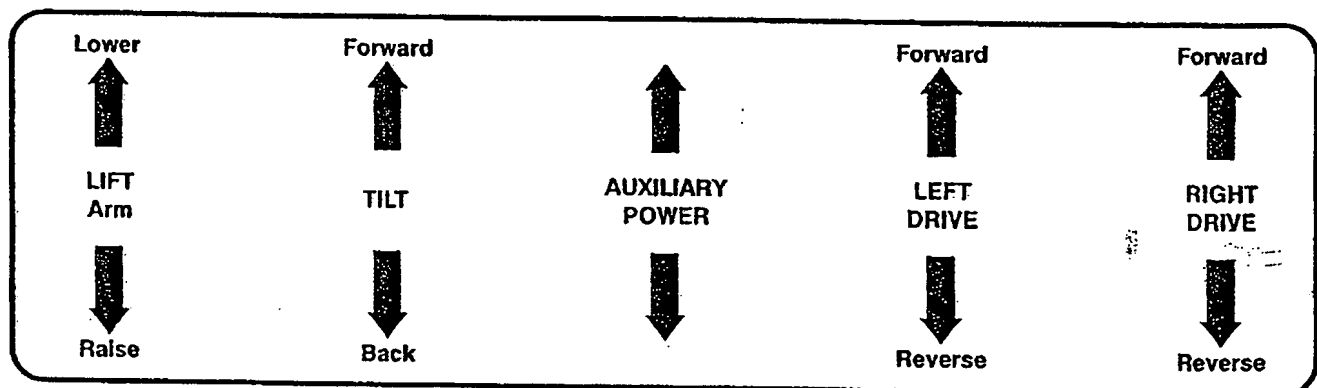
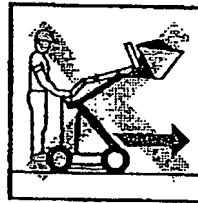
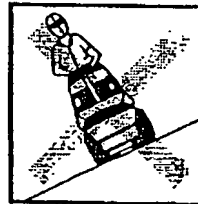
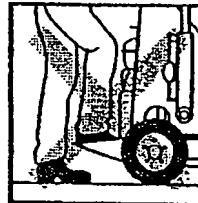
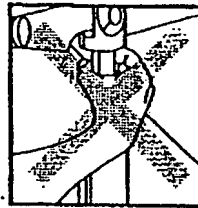
Operating Instructions

Part No. 179150

Location: Far L/H side on rear face

1 Safety First

2. Wear close fitting protective clothing and shoes.
3. Keep hands, feet and clothing away from all moving parts and rams.
4. Do not allow more than one person on the Mini-Skid at any time.
5. Do not smoke while fuelling or operating the Mini-Skid.
6. Do not operate any of the control levers including auxiliary power take-off unless you are standing with both feet on the platform and firmly holding the grip handles.
7. Do not place feet under the platform.
8. Do not ride in the bucket.
9. Do not allow any other person or animal close to the Mini-Skid while in operation.
10. Ensure adequate ventilation when using the machine in confined spaces.
11. Do not drive the Mini-Skid across steep slopes.
12. Always place bucket on ground when parking or leaving the Mini-Skid unattended.
13. Do not carry load with the arms in a raised position. Always carry loads close to the ground. Do not step off platform with load raised.
14. Caution - Never jerk the control levers, use a steady even motion.



Operating Levers Decal
Part No. 1179159

MINI-SKID SPECIFICATIONS

RATED OPERATING CAPACITY

900 lbs. (409kg)

Decal: 9" Taskmaster 900T
Black c/w Red Stripe
Part No. 1179246

Decal: 900 Rated Oper. Cap.
Black on Yellow Back
Part No. 1179267

Decal: 11" Taskmaster 900T
White c/w Red Stripe
Part No. 1179247

Decal: 14" Taskmaster 900T
Black c/w Red Stripe
Part No. 1179248

Decal: 7" Head + 900T
Black
Part No. 1179249

Ignition Switch Decal
Part No: 1179157



Patent

Part No: 179152

Location: Top centre of rear face

INT. REG. PAT. No. PCT-AU83-00165
INT. REG. DESIGN No. 1017838

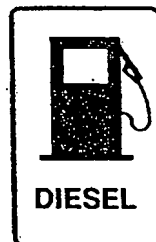
Throttle Control Decal
part No: 1179156



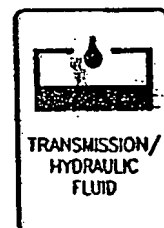
Decal: Gasoline
Black on Yellow Back
Part No: 1179162



Decal: Diesel
Black on Yellow Back
Part No: 1179073



Decal: Hydraulic Fluid
Black on Yellow Back
Part No: 1179163



T039405

MINI-SKID IDENTIFICATION

The Mini-Skid serial number plate is located on the rear face of the control under the lift arm. The Briggs and Stratton engine serial number is located on the right side of the engine fan shroud. In order to qualify for warranty, the "New Mini-Skid Warranty Registra-

tion Form" must be completed and one copy mailed to **RAMROD EQUIPMENT**. One copy should be retained by the Selling Dealer, and one by the Owner. For engine warranty, refer to the Engine Owners Manual.

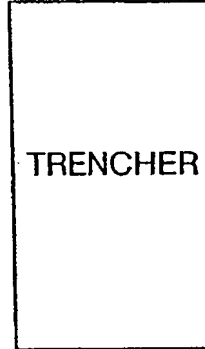
T039406

Attachments Limited Only

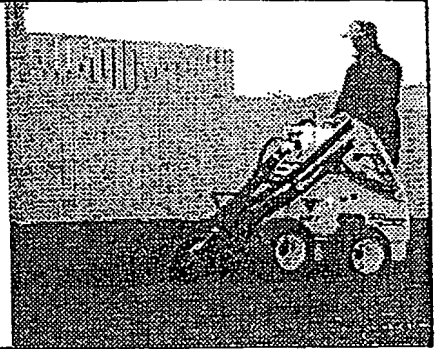
BY YOUR IMAGINATION!



B-78
BACKHOE



TRENCHER



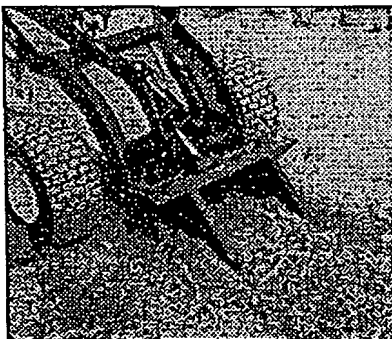
POST
HOLE
AUGER



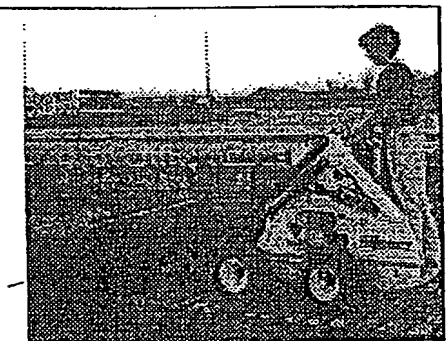
SNOW
BLOWER



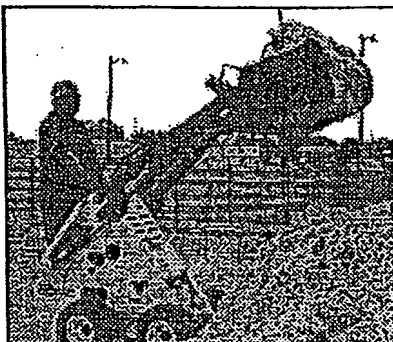
RIPPER



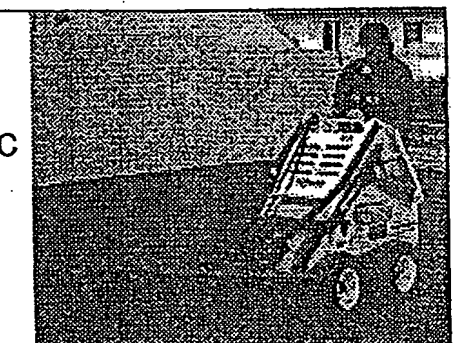
ROTARY
ANGLE
BROOM



LOOSE
MATERIAL
HANDLER



HYDRAULIC
DOZER
BLADE



Grapples, Pallet Forks, Leveller, Etc.

... Attachments are in continuous development. For the latest releases contact your **RAMROD** Dealer or **RAMROD EQUIPMENT** directly.